

REFERENCE COPY

DO NOT REMOVE  
FROM THIS ROOM

Volume 4 Number 22

\$2.95

October 29, 1983

# Real Businessmen Program!

*PC Labs  
Tests  
19 Products  
In 5 Languages:  
BASIC, COBOL,  
Assembler, Pascal, and C*

```
IF MODE-IS-UPDATE  
  COMPUTE AMOUNT=PRICE*QUANTITY  
  PERFORM A100-UPDATE-MASTER  
ELSE PERFORM A900-ERROR-ROUTINE
```

```
for i:=1 to 12 do begin  
  profit(i):=income(i)-expenses(i);  
  yearly:=yearly+profit(i);  
end;
```

**3-in-1 Boards:  
Save Dollars  
And Slots**

**PC Storyboard:  
Business Graphics  
Breakthrough from IBM**

**Keyboard Macros:  
6 Products Compared**



Introducing  
the new  
standard  
in tape  
backup  
systems.



Maxell Corp. of America, 60 Oxford Drive, Moonachie, NJ 07074



**maxell**  
FLOPPY DISKS  
THE GOLD STANDARD

CIRCLE 230 ON READER SERVICE CARD

# AT Power

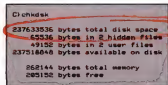
## High performance, high capacity hard disk subsystems

A Single DOS Volume up to 240 formatted MBytes in size on your PC is only the beginning of Emerald subsystems' features. However, it is a very important one to many of our customers.

Most serious micro computer users are familiar with the infamous 32 MByte DOS Barrier. Some of you have only read about it; others have run up against it head on when trying to run PC Focus or a downloaded mainframe program.

If you are one of those who have hit it head on you'll be pleased to know that for almost a year Emerald has been shipping fixed disk subsystems that solve your problem. Subsystems. Plural.

All Emerald subsystems can be operated as a single volume up to their formatted capacity. That includes our 36, 50, 70 and 140 MByte subsystems, in addition to the 280.



Actual printout of CHKDSK on 240 MByte volume.

**You Determine** how many volumes exist in your PC, and what size they are. You can have as many as 24 volumes, and make each one exactly the size it needs to be.

Setup is menu driven and as simple as "How many do you want" and "How big should this one be?"

**Integrate your existing hard drive** into your new subsystem. Emerald's Disk-Meld technology makes it possible for your XT's 10 MByte, or AT's 20 MByte drive to become part of a single large volume. For example, if you have an AT with a 20 MByte

drive and an Emerald subsystem with a 70, you can use all your storage as a single 90 MByte volume. Disk melding makes it easy to combine Emerald drives with each other or with your existing drive to get a subsystem with the storage capacity you need.

**Operating System and Network** flexibility is yours for the asking. DOS 2.X, and 3.X will get you started. But, your Emerald subsystem can also support multi-user operating systems such as XENIX, VENIX, QNX and PCIX and networks such as Novell, Sytek, Ungermann-Bass, 3 COM, X-Net, 10 Net, DNA Systems...

**Additional Features** include password security, 30 millisecond average access time, automatic retreat to a safe landing zone in the event of power failure or shutdown, and a long list of PC and AT compatible micro computers.

## High performance 1/4" tape backup

60 MBytes in 12 minutes is *FAST* backup, but there's more. If your files are larger than 60 MBytes, Emerald's Backup and Restore Utility (BRU) software will automatically break your file into 60 MByte sections and prompt you for a new cartridge. Of course, restoring is just as easy.



Compact tape drive fits in the AT's front panel expansion space. 60 MByte cartridges are certified for high performance and supplied with color coded labels.



Emerald subsystems were designed for the PC, AT and compatibles such as the IT & T 6300 and Compaq DeskPro.

Menu driven software makes it simple, even for novices, to backup or restore exactly what is needed, and no more. Choose one or more files that were modified after a Specified Date and Time, one or more Specific Files or Directories, or All Files and Directories on a DOS Logical Volume.

**Restore data on a different micro** if you like. Backup up your company's Emerald subsystem in Portland, Maine and ship the tape to your office in Los Angeles. Because of the defect mapping technique used on Emerald hard disks, the subsystem in L.A. will import your data error free.

Special defect mapping technique allows data to be restored on subsystems other than the original source.

The BRU software automatically checks, and adjusts to, the defect map of every Emerald subsystem before restoring data to it.





# is Yours.

## Configured for today's Micros

The Physical Design of the Emerald subsystems lets you determine the configuration that will best serve your needs. Many of today's high performance micros have sacrificed expansion space in favor of compact size; others offer plenty of room for additional drives, tape units and expansion cards. Emerald subsystems provide you with the expansion ability you need. And, they're designed to allow you to continue to expand as your needs continue to grow. No matter which PC you have, there is an Emerald subsystem that will meet your needs.



*Subsystems are available for the PC, AT and true compatibles in a variety of configurations.*

**Internal Expansion** is easy on the IBM AT and XT. Emerald subsystems are pre-initialized and pre-formatted—just slide the tape or hard drive you have selected into one of the existing expansion areas, plug in a couple of cables, tighten a few screws and replace the system cover. Elapsed time: 10/15 minutes.

The AT accepts 280 MBytes or any single drive up to 140 MBytes and a 1/4" tape drive. The XT accepts any Emerald hard drive up to 140 MBytes in size, or the 1/4" tape drive.

**External and Portable expansion** is easy and practical with the Emerald Portable Subsystems. These IBM color-matched subsystems have their own power supply and are available with hard drives up to 140 MBytes in capacity or with a 1/4" tape drive.

Ordering a tape host adapter card for each of your PCs and physically moving the 1/4" portable tape subsystem to where it is needed will save you *thousands of dollars* over the cost of individual portables for each micro.

The portable hard drive configuration is ideal for security sensitive environments. The hard disk is password protected and the entire subsystem is small enough to be locked in a standard safe or filing cabinet.



*"Expansion chassis" subsystem also provides 6 additional spaces to add cards to your PC.*

**The 6 Expansion Slots** in the Emerald expansion subsystems will be a welcome addition to many micros. If you don't have enough expansion room in your micro, or, if you've used every available slot, then one of these subsystems is just right for you. They are closely matched to the IBM PC in size and color, and have their own, built-in, power supply.

Expansion subsystems are available with drive sizes to 280 MBytes in capacity, with, or without, a built-in 1/4" tape drive. When coupled with an AT a truly powerful computer system results.

## The real backup procedure

**Standing Behind You** all the way is the company that broke the 32 MByte DOS barrier.



*Documentation, host adapter card, software and cables are included with each subsystem.*

First, we provide everything needed to get you up-and-running quickly. Then, we back you up with specialists, available 16 hours a day, to help with network implementation, applications support, XENIX and technical questions, and to provide *48 hour in-and-out repair service*.

Delivery and Warranty are important considerations. Your Emerald subsystem will be shipped within 14 days of order, via UPS, and comes with a 30 day money back guarantee and a 120 day warranty. Warranty extensions are available for 1 and 2 year periods.



*Fast service and fast shipping are company policies.*

**Users with large database applications** in factory automation, CAD/CAM, accounting, medical, R&D, Point-of-Sale and many other areas are already telling their friends about Emerald. A large percentage of them are in Fortune 500 companies, and many others are on their way to Fortune status.

If your company fits one of those categories, or, if you're a smaller company with an application you thought could only be done on a mainframe or mini, pick up the phone. Call Emerald. An Applications Engineer is standing by to answer your questions, send you literature and refer you to an installed site in your area.

Let one of our customers tell you, first hand, how Emerald helped give his AT Power.



**Emerald**  
Systems Corporation

Mainframe Storage for Micros

4757 Morena Blvd  
San Diego, CA 92117  
(619) 270-1994  
U.S.A.  
Telex: 353458 EMERSYS  
Easynrk 62853804





## “What do we mean by *honest* accounting software?”

**W**e mean software that does what it says it will do; it works in the real world.

### What does RealWorld™ accounting software do?

Our fully integrated accounting line offers General Ledger, Accounts Receivable, Payroll, Accounts Payable, Order Entry, Inventory Control and Sales Analysis as honest solutions to your accounting problems. Our software runs on most popular micro-computers.

RealWorld software has been designed to suit your business accounting needs. Our software is built on the actual livefeedback collected from our dealers and users over the last ten years.

An installed base of over 80,000 satisfied users has kept us in touch with the true needs of business accounting in the real world. An independent survey of computer retailers rated us #1 in technical performance, documentation, user friendliness, features and adaptability.

### See for yourself what RealWorld can do

Seeing is believing—go to your local computer dealer and get a live demonstration of our software. You can enter real data about your real life accounting problems and see the results for yourself.

Insist on the accounting software that does what it says it will do. RealWorld is available at most major computer stores, or call us direct for the number of the dealer nearest you. Or send us the coupon below and we will mail the information to you without delay.



**RealWorld Corporation**  
Dover Road  
Chichester, N.H. 03263

**1-603-225-9565**

RealWorld is a trademark of RealWorld Corporation

I'd like more information about the Accounting Software that does what it says it will do and the name, address and phone # of the computer store nearest me that has RealWorld Accounting Software.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip Code \_\_\_\_\_ Phone # \_\_\_\_\_

Hardware \_\_\_\_\_

Type of Business \_\_\_\_\_

PC102066



## FEATURES

## COVER STORIES

**Programming Makes Sense for Business** ..... 108

*John Dickinson*/Using programming languages to squeeze maximum productivity out of PCs has become so prevalent in business that programming skill is no longer an arcane specialty, but a general necessity. The question is no longer "Do I program?" but "What language should I program in?" To help you find an answer, we recruited professional programmers to give you the lowdown on the five most popular languages and their implementations on the IBM PC. For each language, we print both benchmark test results and source code listings for each of the tests, giving you the full story on business programming and the languages that make it tick.

**BASIC** ..... 116

*Richard Aarons*/Since the PC's inception, BASIC has remained the most popular PC programming language largely because of its ability to get things done. Recently it has evolved in the direction of the new structured languages, such as Pascal and C. Here's one user's case for BASIC and a look at what's new and exciting in BASIC compilers and interpreters.

**COBOL** ..... 124

*Stephanie Stallings and Eric Bank*/The preferred mainframe language of the business world is now 25 years old. How has COBOL handled its advancing years? For one, it now produces tight, fast-executing code, making it a powerful weapon in the PC's arsenal. Here are four of the compilers that helped extend COBOL beyond its mainframe roots.

**Assembler** ..... 132

*Charles Petzold*/Assembly language programming is one of the most arduous and frustrating challenges that exist for the PC user, often requiring pages of instructions to perform the simplest of tasks. However the tight, fast-executing code that comes out of all those instructions makes the assembler challenge potentially very rewarding.

## COLUMNS/DEPARTMENTS

**WHAT'S INSIDE** ..... 15

A behind-the-scenes glimpse into the making of *PC Magazine*.

**PC NEWS** ..... 38

Nine pages of up-to-the-minute news, product minireviews, interviews, short features, and commentary.

**FROM THE EDITOR'S SCREEN****The Lowdown on the Slowdown** ..... 59

*Bill Machrone*/What's the real story behind the supposed downturn in the PC industry? The current industry growth rate of 15 to 20 percent isn't quite the 40 to 50 percent it once was, but it's nothing to sneeze at, either.

**LETTERS TO PC MAGAZINE**... 63

Our readers respond.

**THE NORTON CHRONICLES****The Trouble with EGA** ..... 79

*Peter Norton*/IBM's Enhanced Graphics Adapter represents a giant step toward unifying display technology but leaves software developers struggling to catch up to the new standard.

**QUANTUM LEAP****Guerrillas in the Computer Revolution** ..... 97

*Ron Jeffries*/Commodore's Amiga and Atari's ST are good enough to offer some healthy competition to the established personal computer industry.

**COMPUTERS AND SOCIETY****Eavesdropping at the PC Party** ..... 103

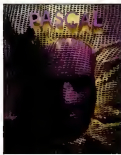
*Stephen Manes*/Is there a lover's spat developing in America's romance with the computer?

**PROGRAMMING/UTILITIES****A Sight Better than TREE** ..... 199

*Charles Petzold*/VTREE does what DOS's TREE utility does, but it adds a graphics touch to your tree display.

**SPREADSHEET CLINIC** ..... 207

*Jared Taylor*/Splitting 1-2-3 into personal subdirectories, entering ZIP codes into cells, debugging spreadsheets, and more.



**Pascal** ..... 140  
*Jeff Duntmann*/Recent advances in its ability to easily access machine-specific functions have made Pascal programming—once considered a strictly academic discipline—newly popular for developing applications and utilities. Here's a look at three of the powerful implementations that have adapted Pascal for the IBM PC environment.



**C** ..... 152  
*Kaare Christian*/Computer instructions written in C can be as terse as the language's name. C is a language for "power programmers" in that it allows the programmer plenty of freedom in accessing machine-specific functions while keeping the overhead low and the speed of performance high. Here's a look at four popular C implementations.

## SOFTWARE

### PC Storyboard: Business Graphics

**Get Moving** ..... 163

*Diane Burns and S. Veni*/IBM's new PC Storyboard is a powerful graphics program whose four separate components—Picture Maker, Picture Taker, Story Editor, and Story Teller—let you create, edit, and combine business graphics and freehand drawings and create customized typefaces. You can even incorporate "snapshots" of whatever you can put on your screen into your finished designs. Best of all, with its quality design and first-rate documentation, it's easy to use.

### Power Plays at Your Keyboard

*David Obregón*/Keyboard macro utilities are acquiring useful and exciting features so quickly that it's difficult for bedazzled users to keep up. Here's a comprehensive look at six packages that exemplify the recent advances in this fast-growing software category.

## HARDWARE

### Expanding Expansion Options: Persyst Color Combo and Gold Quadboard

*Frank J. Derfler, Jr.*/If your PC is configured to the limit and still lacks that one last essential add-in item, two new combination cards—Quadram's Gold Quadboard and the Persyst Color Combo Card—can save you both money and expansion slots by putting more functions than ever before on a single board.

## POWER USER ..... 213 | REVIEWS IN BRIEF ..... 235 | READER SERVICE CARD ..... 259

*John Dickinson*/Colorful Crosstalk XVI, setting printer options, speeding up MultiMate, an HP LaserJet fix, and changing cursor sizes in Turbo Pascal.

### USER-TO-USER ..... 221

*Paul Somerson*/An easier way to generate BASIC DATA statements, quickly changing screen colors, rediscovering lost cursors, switching between monitors, and avoiding inadvertent deletions.

### PC TUTOR ..... 229

*Charles Petzold*/Troubles with CHKDSK, Word on a hard disk, and PCjr's video mismatch.

A children's game from Infocom, a mailing-list aid, and a DOS menu generator.

### THE SHORT REPORT ..... 237

*Phil Wiswell*/A 1-2-3 tutor in game form and software to help you eat right.

### NEW ON THE MARKET ..... 239

*David Obregón*/New ways to automate complex communications and pick up electronic mail as well as a fast new printer.

### PC:MART ..... 246

### PC BLUEBOOK ..... 248

### PRODUCT INDEX ..... 263

Products in the pages of PC Magazine.

### BOOK REVIEW

#### AI: The Formative Years and the Future ..... 267

*Terry Nasta*/Two new books, *Mind over Matter* and *Tools for Thought*, take penetrating looks into the science and industry of artificial intelligence.

### INDEX TO ADVERTISERS ..... 273

### COMING UP ..... 277

**Cover Photograph:** Gregory Cannon



## Introducing the TI 880 AT Printer. Because you need a multi-user printer that works overtime.

The last thing you need is the wrong printer. A printer that quits when your work is nonstop. Or one that burns out from overwork.

Let's say you have a typical multi-user environment or a local area network. It includes IBM Personal Computer ATs, PC/XTs or compatibles. What you need now is a printer that can handle your system's entire workload. A printer you can trust your business to.

You need a high-speed printer

that's software compatible with PC industry standards and capable of sustaining 300cps. It should have straight paper paths to eliminate jams, changeable fonts and enhanced print modes to take care of draft, correspondence and graphics. Its design should be rugged, durable and as reliable as you've come to expect from TI printers.

The OMNI 800™ Model 880 AT Printer from TI fits this description. The printer that works overtime.

Because business doesn't stop just because your printer did.

Find out about the new TI 880 AT Printer and how it can help solve your multi-user printing problems. Call 1-800-527-3500 ext. 808, in Canada 416-884-9181.

  
**TEXAS  
INSTRUMENTS**  
Creating useful products  
and services for you.

# FOR THE FIRST TIME... HIGH PERFORMANCE BACKUP AT A FLOPPY TAPE PRICE



## WHO NEEDS FLOPPY TAPE !!

### The Everex EXCEL STREAM-20 Cassette Backup System

- No extra expansion slot needed
- High Speed—up to 10MB in just 2 minutes
- No time-consuming pre-formatting
- 20MB backup capacity
- Same price as 10MB floppy tape systems
- Internal and external models for the PC, XT and AT

Replace your floppy disk controller with Everex's combination cassette AND floppy disk controller—no extra cost, no extra slot needed. Data is automatically verified/corrected and the tape is pre-formatted during backup—saving you the 30 minutes you waste to format and verify with a floppy tape system. The STREAM-20 includes the most advanced backup/restore software. The choice is simple—the Everex EXCEL STREAM-20 Cassette backup system—High Performance backup at a floppy tape price. Visit your local Everex Dealer today and ask to see the STREAM-20 in action. For the name of your nearest Everex Dealer, please call 415-498-1111.

Address: 47777 Warm Springs Blvd.,  
Fremont, CA 94539  
TELEX: 5104000590 EVEREX  
FAX: 415-654-0728

Dealer Hotline: (800) 821-0806  
In CA (800) 821-0607

	EVEREX EXCEL STREAM-20	Floppy Tape	Sony Image
Capacity	20MB	10MB	10MB
No extra slot needed	•	•	•
Backup time for 10MB	2min.	4min.	4min.
Automatic Verification	•	•	•
Automatic Formatting	•	•	•
File-by-File Restore from Image Backup	•	•	•
Internal Model	•	•	•

EXCEL STREAM-20 is a trademark of Everex Systems Inc.

**EVEREX**  
LIFE IN EXCESS

or the IBM PC,<sup>®</sup>  
AT<sup>®</sup> and compatibles.



## We put hard disk storage and backup where it belongs.

### Maximum storage in a minimum space.

A mass storage solution for personal computers need not occupy massive amounts of space.

That's why Kamerman Labs packs an entire hard disk storage and backup system into a package only 2½ inches high.

In fact, our Masterflight system is so well integrated with your PC, it looks like it should have been there all along.

### Hard disk storage.

Inside the Masterflight is a high-performance hard disk system, available in 10, 20 or 30 Megabyte versions. You get up to 100 times the storage capacity of floppies. At up to 10 times the speed. Spend more time working and less time waiting.

### Streamer tape backup.

Any professional working environment demands a reliable backup solution. The Masterflight provides it through a high-performance streamer tape that backs up an entire 10 Megabytes in less than 4 minutes. Streamer tapes are available in 20, 40 and 60 Megabyte capacities. Instead of just a hard disk, Masterflight gives you a complete data storage solution.

### Power control.

Masterflight directs power to your computer, monitor, printer and two other devices through front panel switches. No more blind groping on back panels to power up your system.

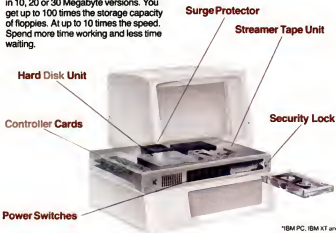
### Surge protection.

A little power surge can produce a lot of damage. Masterflight protects your system with special circuitry that filters out spikes, surges and line noise.

### Security.

Masterflight guards access to your system through a fully lockable power switch.

Phone today. Dealer and OEM queries welcome. 800-522-2237 in Oregon, Hawaii and Alaska call 503-626-6877



**Kamerman Labs**

8054 SW Nimbus, Bldg. 6  
Beaverton, OR 97005  
Phone 503-626-6877

CIRCLE 317 ON READER SERVICE CARD



# NEXT GENERATION

**HOMEbase™ BREAKS THE SOFTWARE BARRIER BY COMBINING ALL THE RESIDENT PROGRAMS YOU'VE ALWAYS WANTED... INTO ONE SOLID PIECE OF SOFTWARE THAT LIVES IN YOUR COMPUTER ALONGSIDE WORDSTAR, LOTUS OR WHATEVER ELSE YOU HAPPEN TO BE RUNNING.**



**"We like HomeBase. It comes from the next generation of resident utilities."**

**Paul Freiburger  
& Phillip Robinson**

*President  
of  
Amber Systems, Inc.*

**\$49.95**

(incl. copy & shipping)

## FEATURES

- **Notepads**—you can have a single, simple notepad, or use HOMEbase's full power to have a series of notebases, indexed, cross-referenced and fully searchable and sortable.
- **Calculator**—designed for simple calculations and complex formulaic work as well.
- **DOS Services**—you can open multiple directories onscreen, move, copy, view and even edit files from this powerful feature. And you can get a beginner up and running with MSDOS in just minutes.
- **Instant Databases**—just hit the hotkey to freeze whatever software you're working in, and you're ready to find, insert or manipulate data. Hit it again, and you're back working in your original software without losing a beat!
- **Auto Dialer**—stores configuration data for each name... even the window size you choose for that particular communication.
- **Alarm**—a window opens containing your appointment information, and the alarm first ticks, then rings.
- **Multiple Phone/Address Directories**—create as many as you like.
- **Relodex™ Card Printer**—prints your HOMEbase address book directly onto continuous form Relodex cards.
- **Template Maker**—create instant entry forms for your HOMEbase Databases.
- **Cut & Paste**—from anywhere to anywhere! You can even cut columns of numbers and paste them directly into your HOMEbase Calculator for instant addition!
- **Programmable Hotkeys**—you can choose the hotkeys you want to take you into HOMEbase's features.
- **Multiple Phone Message Pads**—a secretary can keep a separate message pad system for each of a number of people. Fully searchable and sortable, too!
- **Time & Expense Diary**—the easy way to keep out of trouble with the IRS.
- **To-do List**—with all bowed.
- **Background Electronic Mail**—your electronic mail arrives and files itself while you're working in another piece of software!
- **Quickterm Terminal**—instant communications, available at the touch of a hotkey.
- **Mailing Label Printer**—print labels from your address book in just seconds.
- **Screen Saver**—automatically turns off your screen when you haven't hit the keyboard for a while. To turn it back on again, just hit any key! Prevents image burn-in.
- **Type Ahead Keyboard Buffer**
- **On-screen clock**—just hit the hotkey.
- **Multiple Calendars**—HOMEbase allows the user to keep track of numerous appointment books. And to search across one or all of them. Imagine how valuable this can be for a central secretary or receptionist!
- **New Easy Installation**—NOW HOMEbase can easily be installed by everyone!

## ORDER YOUR COPY OF HOMEbase TODAY!

(NOW... ALL ORDERS SHIPPED WITHIN 48 HRS.!!)

For Visa, American Express and MasterCard Orders Call Toll Free **1-800-538-8157 ext. 624** California **1-800-672-3470 ext. 824**  
Call Mon-Fri 6am to 12pm, Sat & Sun 6am to 8pm (PST) Or fill in this ORDER FORM enclose check, money order or Visa, American Express or MasterCard number. HOMEbase is available for the IBM PC, AT, XT and True Compatibles. Requires at least 256K (320K or more is recommended) so that it can reside in memory at the same time you're running other programs.

**HOMEbase \$49.95 + \$5 for shipping and handling\***

check ☐ money order ☐ VISA ☐ MasterCard ☐ American Express ☐ Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Home Phone ( ) \_\_\_\_\_ Work Phone ( ) \_\_\_\_\_

\*Customer residents add 6% sales tax. Outside U.S. please add \$15. Checks must be on a U.S. bank and in U.S. dollars. Sorry, no C.O.D. or purchase orders.

For dealer and site license information, call 408-996-1883.

SEND TO:

**AMBER**

Amber Systems  
1171 S. Saratoga-Sunnyvale Road  
San Jose, CA 95129

PCM

**YES! Site licenses are available for companies... large and small. For further information on site licenses call 408-996-1883.**

Homebase is a trademark of Amber Systems. Relodex is a trademark of Monotype. Relodex is a trademark of Relodex Corp. Lotus 1-2-3 is a trademark of Lotus Development Corp.

CIRCLE 119 ON READER SERVICE CARD

# ONLY **ALL CARD™** WITH 'MMU' FOR THE IBM FULL MEGABYTE POWER FOR SYMPHONY, ABOVE BOARD, AST, QUADRAM AND OTHERS



'MMU' CHIP ▶

▶ 'MMU' MODULE



## THE NEW BREED OF MULTIFUNCTION CARDS.

### **ALL CARD AT1**

With AST SIXPAK, QUADBOARD, JRAM, or the newer INTEL ABOVE BOARD, you limit your PC growth. The **ALL CARD AT1** is expandable to 2MB on board (4 MB in two slots) and FULL MEGABYTE POWER with the ALL 'MMU' Module Option. **ALL CARD AT1** starts with all the multi-function features and 256K at S445. Even the standards are designed for software of the future —the calendar clock has non-volatile RAM with alarm interrupts and the serial port has multiple addresses. Also, mix 64 & 256K chips.

### **ALL CARD AT1/M**

This model comes equipped with all the features of **ALL CARD AT1** plus the ALL 'MMU' Module Option which includes ALL/MOS (Memory Operating Software). With a simple menu-driven installation procedure, ALL/MOS converts your existing software to 1MB DOS, and delivers FULL MEGABYTE POWER.

## 'FULL MEGABYTE POWER'

**1 MEGABYTE DOS.** Break the 640K barrier. Run existing versions of the popular business packages IN 1 MB including 1.2.3, SYMPHONY, FRAME-WORK, dBASE, APL, TOPVIEW, SIDEKICK, MULTILINK, CROSSTALK, TURBO PASCAL, C86, IBM MACRO ASSEMBLER, MULTIMATE, WORDSTAR, NOVELL, PC NET.....

**4 MEGABYTE EXPANDED MEMORY SPEC.** Run 4 megabyte software conforming to the LOTUS/INTEL/MICROSOFT specification, with enhancements. SYMPHONY 1.1 has already been released and 1.2.3, FRAMEWORK and others are coming.

**MULTI-MEGABYTE, MMU PROTECTED RAM DISK.** Run **ALL DISK** as large as you like with full assurance that it is fully hardware protected from inadvertent tampering by you, others, or programs with 'bugs'.

**FUTURE INDUSTRY EXTENDED MEMORY SPEC.** Run higher performance software conforming to the future specification for machines equipped with MMU. IBM PC AT is IBM's first personal computer with MMU. With **ALL CARD** your PC and XT also have MMU.

Full megabyte power means you can run all of the above either individually or together. And more. Provide Memory Management Unit (MMU) hardware for DOS/UNIX and other multitasking, multiuser and VM (Virtual Machines) operating systems of the future.

IBM is a registered trademark of International Business Corporation. UNIX is a registered trademark of Bell Laboratories. 1-2-3, Symphony, Framework, APL, Topview, Above Board, AST, Sixpak, Quadboard, JRAM, INTEL, dBASE, Sidekick, Multilink, Crosstalk, Turbo Pascal, C86, Multi-Mate, Wordstar, NOVELL, PC NET are trademarks of the respective companies. **ALL CARD** is a trademark of **ALL Computers Inc.**

PC, XT & COMPATIBLES DELIVERS  
1-2-3, FRAMEWORK, APL, TOPVIEW...  
WITH BS CAN'T DO IT. IBM PC AT CAN'T DO IT.

# THIS IS NOT BS

(Bank-Switching)

Memory is the single most important part of a computer. A faster CPU can save you minutes, but more memory can save you hours. More memory consolidates multiple jobs and spreadsheets into a single run. The result is the job is simpler to design, faster to run, and much less error prone. Picking the right method to expand memory is vital to the future life of your PC. This is what the industry is saying about 'MMU' and Bank-Switching...

## **PC Magazine—May 14, 1985**

**“**Several industry leaders have echoed... concern that (Bank-Switching) is only a stop gap measure on the way to full use of... on chip memory management (MMU). PC Magazine shares that concern.”

## **PC Week—April 16, 1985**

**“**MMU, a function that controls how memory is addressed, is more sophisticated than Bank-Switching techniques”

## **PC Magazine—June 11, 1985**

**“**Spring COMDEX..... The introduction of a memory expansion card (**ALL CARD**) with full memory management facilities for 4 megabytes of on-board PC RAM was one of the more exciting of these developments”

“..... (**ALL Computers Inc.**) seems to have stolen a march on the major board makers”

## **Personal Computing—August, 1985**

**“**Alone and away from the din over Bank-Switching technology..... a four megabyte, multifunction board (**ALL CARD**) that allows almost all software to utilize its memory right out of the box.”

There is clearly only one way of the future—full memory management! In the past, Bank-Switching was obsoleted by MMU with mainframes and again with minicomputers—and now with personal computers. **ALL CARD** gives you the best of both worlds — 4 MB LOTUS/INTEL/MICROSOFT Expanded Memory Specification (Bank-Switching) and 1MB DOS (MMU) today, and Extended Memory Specification (MMU) tomorrow.

**ALL CARD** stands alone with its proprietary MMU CHIP for the IBM PC—it alone offers you the future today.

## **SPECIAL TRADE IN OFFER**

Trade in your AST Sixpak, Quadboard, JRAM or other old multifunction card and free up an expansion slot in the process. **ALL Computers Inc.** is offering up to \$400 towards the purchase of an **ALL CARD AT1/M**. Offer is limited. Act now! Trade it in or leave it in and add the **ALL CARD** to your PC.

# **ALL Computers Inc.**

102 Bloor St., W., 12th Floor,  
TORONTO, CANADA M5S 1M9.

(416) 960-0111 TELEX 06-986766

CIRCLE 157 ON READER SERVICE CARD

# Free Christmas pies in every box.

Put in your thumb and pull out a plum.  
Namely, Boardroom Graphics.®

From now 'til Christmas,\* you'll find a free copy of this highly-acclaimed business graphics program in every specially-marked box of Dysan® DS/DD diskettes.

Boardroom Graphics lets you turn data from your spreadsheets and other databases into 3-D graphics. Line charts. Scattergrams. Bar graphs. Cluster bars. And, of course, pie charts.

Just boot it up on your IBM® PC, XT or compatible.\*\* Follow the

easy-to-use menus. You'll be cooking up tasty presentations in no time.

To get the free software, of course, we do ask that you buy the Dysan diskettes. After all, what better place to store your Christmas pies?

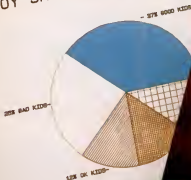
See your Dysan dealer today or call (800) 233-5099.

And say Santa sent you.

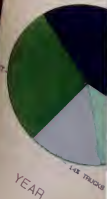
## Dysan®

Somebody has to be better  
than everybody else.

SANTA INDUSTRIES INC.  
TOY SHIPMENTS BY KID TYPE



XZY CORP  
CAPITAL E



\*Quantities are limited. \*\*Requires appropriate hardware. IBM and 128K RAM. Dysan is a registered trademark of Kides Limited in IBM is a registered trademark of International Business Machines Corp. Boardroom Graphics, © 1984, Mark Haley. © 1985, Kides Corporation.

CIRCLE 289 ON READER SERVICE CARD



# What's Inside

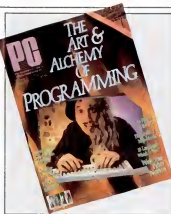
Computer languages are no longer the mystery they used to be. Why? Because business and the professions have taken to programming in a big way since IBM introduced its PC.

Over 2 years ago, editor Bill Machrone researched and wrote an impressive collection of articles titled "The Art and Alchemy of Programming" (*PC Magazine*, Volume 2 Number 4). Machrone's no slouch when the subject is mechanical, digital, or electronic, but in the summer of '83, when programming was remote and abstruse to most people, *art* and *alchemy* struck him as appropriate words to describe our language articles.

Today, a word like *alchemy*, with its connotation of wizardly mumbo jumbo, would be dead wrong. Medieval alchemists tried to change base metals into gold; personal computer users, regardless of their applications, turn computers into servants. They're power junkies. If you aren't a power junkie now, you will be once you've spent 10 minutes writing a BASIC program to clean up a 200-megabyte file that would have taken weeks to fix by hand.

Which brings us to this issue's collection of articles—or, more appropriately, reviews—on programming languages. As special projects editor John Dickinson explains in his introduction, "Programming Makes Sense for Business" (page 108), a surprising number of you have learned (or are learning) a computer language. To many of you, languages are tools for modifying and customizing your particular applications. Two years ago, Machrone could reasonably begin his article on languages by asking, "What is a computer language?" Today, the question for many readers is, "Which language should I learn—or learn more about?"

For many of you, the question is even



*PC Magazine* in 1983 when programming was as mysterious as elixirs and alkaheists.

narrower: "Which particular BASIC (or COBOL or assembler or Pascal or C) is right for me?" And beyond these is a question becoming more common: "What should my next language be?" This issue of *PC Magazine* sets out to answer these questions, tempering the robust opinions of individual reviewers with more-objective benchmark testing.

## E Pluribus Pluribus

Rugged individualism and passionately held points of view flourish among professional programmers and applications-oriented personal computer users, including our reviewers. Take a look at the first few sentences of Dick "True Believer" Aaron's piece on BASIC (page 116). Aarons may have faith, but he's clearly on the defensive. Like many inveterate BASIC pro-

grammers, he's continually under siege by the partisans of Pascal and the acolytes of assembler.

And so it's always been. The father of Pascal, Swiss computer programmer Nicklaus Wirth, feels strongly (language authors always feel strongly) that BASIC, with its lack of structure, encourages sloppy programming (in his opinion, teaching BASIC should be a capital offense). The defenders of BASIC argue that its speed, flexibility, and forgiving nature make it incredibly useful. They use words like *down* and *dirty*, *extemporaneous*, and *accessible* to describe the appeal of personal computing's leading language.

Executive editor and BASIC jingoist Paul Somerson puts it this way: "Speedy structured languages like Pascal and C are great for commercial applications, but nothing comes close to BASIC when you need a program right away or have to do something the least bit tricky. Most of the time, using balky structured languages is like taking a Sunday drive in a new Turbo Carrera with a traffic cop in the backseat. BASIC is the most fun you can have with your clothes on. It's incredibly easy to master—and the price is certainly right."

This issue of *PC Magazine* encompasses opposing opinions about the five languages that, according to a recent reader survey, you are most interested in. We trust that these reviews will encourage contemplation about the kind of language you use. Chances are, you're disposed to being sympathetic to Dick Aarons's defense of BASIC, but before making up your mind, you should also read Charles Petzold on assembler, associate editor Stephanie Stallings and Eric Bank on CO-

BOL. Jeff Duntemann on Pascal, and Kaare Christian on C.

Not only do we present differing opinions in this issue, we compare various versions of each language head-to-head in a

series of PC Magazine Labs benchmark tests. We didn't think it would be fair to pit one language against another, but we tested the most popular versions of each and report the results in this issue.

#### Experts and Slot Savers

More often than not, *PC Magazine* goes "out of house" to assign an article. Of course, not just anybody can write for *PC Magazine*. The chief requirement is expertise in a given subject area backed by solid reviewing/writing skills (and the ability to meet deadlines). An increasingly common development that pleases us enormously is the growing expertise of our staff. Take David Obregón, who joined us as an editorial assistant eons ago (spring '83). Obregón didn't know much about personal computers, but he knew quite a bit about words. Today, he is a *dBASE* terror. He invented and compiled the magazine's subject/author index. Obregón is

Not only do we present differing opinions in this issue, we compare various versions of each language head-to-head in a series of PC Magazine Labs benchmark tests.

also a self-made expert on keyboard macros, about which he writes most authoritatively in "Power Plays at Your Keyboard" on page 167.

Don't pass up Diane Burns and S. Venit's review of *PC Storyboard*, the niftiest software package we've ever seen with Big Blue's logo on it (page 163). As far as contributing editor Frank Derfler is concerned, the new 3-in-1 boards from Persyst and Quadram can save you dollars and slots. To find out how, see page 177.

#### Pledge Time

We promise not to wait another 2 years to review personal computer languages. They're an ongoing story. In fact, things are really going to heat up in the next 6 months as several well-known software manufacturers release sizzling, easy-to-use versions of some of the most widely used PC languages. C will probably explode the way Pascal did—and BASIC may become more popular than English. We'll keep you posted.



## Dot Matrix Made Beautiful

All the type in this ad was printed on an inexpensive dot matrix printer with Fancy Font, the program that works with almost any word processor to produce high resolution, proportionally spaced, letter quality printing.

No special hardware or installation is required, so you'll be using Fancy Font as soon as you get it.

Fonts, including Roman, Sans Serif, Bold, Italic, Script, Old English and more, from 8 to 24 points come standard with Fancy Font.

**FLEXIBLE.** Fancy Font comes with a complete set of over 1500 mathematical, foreign language and other special symbols.

Hundreds of additional fonts in sizes from 6 to 72 points are available, at a nominal additional charge, from our growing font library.

You can edit any character and also create your own characters or logos, up to 1 inch by 1 inch.

Powerful formatting features let you center, justify, wordwrap and type flush left or right, with or without running headers and footers—even with different fonts and sizes on the same line.

**COST EFFECTIVE.** You buy Fancy Font from your local dealer or direct from us, the software developers, for only \$160. You get near typeset quality at a small fraction of the time and cost of using art or typesetting services.

Fancy Font runs on PC/DOS, MSDOS and CP/M systems with Epson, Toshiba and compatible dot matrix printers.

You'll be turning out great looking reports, newsletters, presentations, letters, mathematical texts, overdrive or invitations after getting your copy of Fancy Font. The applications are limited only by your imagination.

Call or write now to order Fancy Font or ask for additional information including actual samples and independent reviews.

**CALL TODAY 1-800-351-0600** MasterCard and Visa Accepted

**SoftCraft, Inc.**

222 State Street, Madison, WI 53703 (608) 257-3300

*Fancy Font* is a registered trademark of SoftCraft, Inc.

# Lots of dollars.



# Lots of sense.



## \$69.95

They've been doing it for years. Selling you accounting software module by module, till before you know it you've paid up to five thousand dollars for a complete system. That's a lot of dollars... which doesn't make good business sense.

Now, there's a better alternative. Dac Easy Accounting. For only \$69.95, Dac Easy is a fully integrated accounting package: offering instant access to General Ledger, Accounts Receivable, Accounts Payable, Inventory, Purchase Order, Billing and Forecasting. And Dac Easy has the flexibility to manage either product or service oriented businesses.

It's not just the price that makes Dac Easy better. Only Dac Easy saves three years of history in all files, making automatic forecasting easier and more accurate. Plus, you can generate any of 300 different reports for instant access to the exact information you need.

Dac Easy is menu-driven for ease-of-use, and comes with easy-to-understand documentation inside a handsome slip-case binder. It's also non-copy-protected. Listen to what experts are saying:

*"Dac Easy Accounting is remarkable, amazing, revolutionary, sensational..."*  
Computer Buyer's Guide & Handbook, September 1985

Find out for yourself why Dac Easy is the fastest selling accounting package in history. Compare Dac Easy's range of features against systems costing thousands more. You'll see how Dac Easy can save you lots of dollars. Which makes a lot of sense.

#### PARTIAL LIST OF FEATURES

##### General Information

- Menu driven
- Password protection
- File capacity limited only by disk space
- Support contract available

##### General Ledger

- Unlimited multi-level accounts
- Three-year account history for CRT inquiry
- Pencil and pen feature to correct mistakes
- Unique budgeting routine
- CRT transaction inquiry

- Activity report, trial balance, financial statements, unclassified departments and journals

##### Accounts Receivable

- Open invoice or balance forward
- Customized aging report
- Unlimited number of customers
- Flexible mailing labels and directories
- Supports partial payments & finance charges
- Three-year customer history for number of invoices, sales, costs, and profits
- Customized statements
- Cash flow analysis/sales analysis
- Automatic sales forecasting

##### Accounts Payable

- Check printing with multiple invoices and cash available routines
- Aging reports with seven customized columns
- Unlimited number of vendors
- Flexible mailing labels and directories
- Three year vendor history
- Unlimited allocations per invoice

##### Inventory

- Service or inventory, last purchase, and standard costing methods
- Customized statements
- Powerful physical inventory routines
- Accepts any unit of measure
- Three-year product history in units, dollars, cost, and profits
- Automatic forecast of product sales
- Automatic pricing assignments
- Alert and activity reports with 11 sorts
- CRT shown on-hand-on-order/committed/sales/cost/profit/ratio/CRT

##### Purchase Order

- Inventory and non-inventory items
- Allows up to 99 lines per PO
- Per line discount in %
- PO accepts generic discounts/weight/bases/invoice
- PO accepts back orders and returns
- Purchase journal

##### Billing

- Service or inventory invoicing on plain or preprinted forms with memo
- Prints sales journal
- Allows return credit memo

##### Forecasting

- Unique program that automatically forecasts using your three-year history
- Reports on expense accounts
- Vendor purchases
- Customer sales, cost, and profit
- Inventory item usage
- Forecast by same as last year, or % base from last year, or trend, or least square trend line analysis method

## Dac Easy Accounting

To Order Call Toll Free

# 1-800-431-0800

Ask For Operator 2103

For More Information Or In Texas Call

# 214-458-0038

© dac software, inc. 4801 Spring Valley, Building 110-B, Dallas, TX 75244

Send in this coupon with your credit card number, money order or check for \$69.95 plus \$7.50 for postage and handling. In Texas, add 6% sales tax (\$4.20). Outside U.S., add \$17.50 for postage and handling. No C.O.D.

☐ CHECK ☐ MONEY ORDER  
☐ AMEX ☐ VISA ☐ MASTERCARD Expires \_\_\_\_\_

Account No. \_\_\_\_\_

Name \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Signature \_\_\_\_\_

30-Day Money Back Guarantee: dac software, inc. provides a 30-day money back guarantee that all claims and features listed in this ad are true.

Minimum Hardware Requirements:  
IBM (PC, XT, AT, or AT) or other compatibles, 128K memory, one 5 1/4" floppy disk, EBC column printer in compressed mode, 80X24 CRT, MS-DOS<sup>®</sup>, PC-DOS<sup>®</sup> 2.0 or later.

Trademarks of International Business Machines Corporation.  
©Trademark of Microsoft Corporation.

Dac Easy Accounting

2103

CIRCLE 146 ON READER SERVICE CARD

# DOES YOUR HI-RES GRAPHICS BOARD SHOW YOU ONLY PART OF A SPREADSHEET

When it comes to printing out spreadsheets, most IBM<sup>®</sup>-compatible graphics boards come up short.

But not the Genoa Spectrum<sup>™</sup> Color/Mono/Graphics Board.



The Spectrum Color/Graphics Board is the most compatible board you can buy. Which means it runs the most software, including Flight Simulator<sup>™</sup>, Lotus<sup>™</sup> 1-2-3<sup>™</sup>, Symphony<sup>™</sup>, Slidekick<sup>™</sup>, PC Paint<sup>™</sup>, and much, much more.

It goes all the way to 132 columns. The largest text display of any graphics board you can buy. There's even a special driver that'll show you 132 columns of Lotus, which normally only has 80.

And together with your 132-column printer, the Spectrum can also print every one of those 132 columns. So you can see more of

what you're doing. On the screen. And on paper.

But the best part is, you don't have to pay more to do it. Here's why: Up until now, if you wanted

software in monochrome. And for your monochrome software there's a 720 x 348 hi-res mode.

So either way, you're covered. Spectrum is compatible with all color and monochrome monitors. So you'll always get 16 beautiful colors in color. Or 16 shades of monochrome in mono.

For all the technical specs or the Genoa Spectrum dealer nearest you, just call us at 408-945-9720. Or write Genoa Systems Corporation, 73 E. Trimble Road, San Jose, CA 95131.

The Genoa Spectrum. It's the only board you'll ever need for color, graphics, and full size output.

Anything else is either too much money or incomplete

both graphics and color, you had to buy two boards. One for hi-res mono graphics, one for color.

But the Genoa Spectrum puts color and graphics *on the same board*. So you save yourself a slot. And about \$250.

You can also save yourself the price of a color monitor. Because Spectrum will emulate your color

**Genoa**  
We make IBM PCs better.

Spectrum is a trademark of Genoa Systems Corporation. ©1986 Genoa Systems Corporation.

CIRCLE 238 ON READER SERVICE CARD



# SMALL WONDER. SMALL PRICE.

## GRAPHICS SOLUTION™

ATI's **GRAPHICS SOLUTION** is a multi-application video adapter that performs high resolution monochrome graphics, high resolution color/graphics and color/graphics emulation. The optional Serial/Parallel Expansion Module adds an RS232C asynchronous serial interface and a parallel printer interface without using an additional slot.



**\$299.00**

ATI GRAPHICS SOLUTION	ATI GRAPHICS SOLUTION	PARALLEL MODULAR GRAPHICS	HERCULES GRAPHICS	PARAGON COLORPLUS
CMOS VLSI Gate Array Technology	/	/	/	/
Hercules Compatible Monochrome Graphics	/	/	/	/
Color Emulation on Monochrome Monitor	Full screen in 16 shades No pre-boot software	/	/	/
High Resolution Color/Graphics	320 x 200, 16 colors 640 x 200, 4 colors 640 x 200, 16 colors	/	/	/
IBM Compatible Color/Graphics	132 Columns in either Color or Monochrome	/	/	/
Fast Flicker-free Scrolling in all Modes	/	/	/	/
Serial Port	Opt. *	Opt.	/	/
Parallel Port	Opt. *	Opt.	/	/
Warranty	2 YEARS	1 YEAR	2 YEARS	1 YEAR
Suggested List Price	\$299	\$395	\$499	\$559

\* SERIAL-PARALLEL EXPANSION MODULE \$79  
PARALLEL EXPANSION MODULE \$49

Why stock a whole range of boards when all you need is the **GRAPHICS SOLUTION** by ATI.  
Call now for more information (416) 477-8804.  
Distributor and dealer inquiries invited.

450 Esna Park Dr.  
Markham, Ontario, Canada  
L3R 1H5 (416) 477-8804  
TELEX 06-966640 (CMC — MKHM)

**ATI**  
ARRAY  
TECHNOLOGIES  
INC.

### DISTRIBUTORS

CANADA: Compuserve — (416) 477-8088  
ONTARIO: Wells Data — (416) 890-2603  
BRITISH COLUMBIA: Santronics — (604) 522-9677  
WEST GERMANY: Entcom — Bruhl (02232) 1 30 15



GRAFIX PARTNER — 16 COLORS

16 COLORS HIGH RESOLUTION

COLOR SOFTWARE ON MONOCHROME MONITOR IN 16 SHADES

SYMPHONY HIGH RESOLUTION

HERCULES COMPATIBLE MONOCHROME GRAPHICS

132 COLUMNS

\* Trademarks: Paradise, Modular Graphics Card — Paradise Systems Inc.; Hercules Graphics — Hercules Computer Technology; Grafix Partner — Ringhead; Rethetic, Symphony — Lotus Development Corporation; IBM — International Business Machines; Paragon, Colorplus — Paragon Enhanced Graphics Corp.

# Alloy makes your PC multi-user.

**Introducing Alloy's PC-SLAVE/16. The multi-user PC strategy that doesn't require additional PCs.**

PC-SLAVE/16 transforms your IBM PC into a multi-user, multi-processor system with shared data access and communication between users. All you need is a dumb terminal and a PC-SLAVE/16 board for each user.

And with Alloy's PC-X BUS, you can add up to 31 users. So whether you're adding your secretary or 31 colleagues, Alloy's PC-SLAVE/16 can do it at a much lower cost and with higher performance.

For any system requiring more than one PC, PC-SLAVE/16 is more powerful and less expensive. Each board comes complete with its own 8 MHz, 8088 micro processor and dedicated memory. PC-SLAVE/16 eliminates the need to add costly PCs. And it is ten times faster than LANs (Local Area Networks) at half the cost. Best of all, it's available right now. See PC-SLAVE/16 in action at your local dealer. Or call Alloy today at (617) 875-6100.



**ALLOY**

COMDEX/Fall 85

**ALLOY**  
Computer Products, Inc.

Alloy Computer Products, Inc., 100 Pennsylvania Avenue, Framingham, Massachusetts 01701. (617) 875-6100, TWX: 710-346-0394  
In Europe: Alloy Computer Products (Europe) Ltd., Cirencester, Gloucestershire, England. Tel: 0285-68709, Tlx: 43340

CIRCLE 201 ON READER SERVICE CARD

InfoWorld on EasyLAN  
 "Any product that brings  
 down the cost and improves  
 the ease of use for LANs is  
 for the better."

# Buy A Local Area Network For Less Than \$100 Per PC

**STOP** buying expensive duplicate PC peripherals.

Usually your peripherals just sit idle. If your office owns two or more PCs can you justify a costly printer and multiple disk drives for each PC? How often are your printers actually busy? Thirty minutes a day? An hour a day? Even your expensive hard disk is used infrequently.

The obvious solution to avoid expensive duplicate peripherals is a local area network that allows you to share printer and disk drives. But until now LANs have cost in excess of \$1,000 per PC.

## INTRODUCING THE EasyLAN™ OFFICE NETWORK

EasyLAN shares printers and disk drives between IBM PCs. EasyLAN can save you \$1000 or more per PC by eliminating duplicate equipment purchases. EasyLAN advantages:

- EasyLAN shares printers, disk drives, and information
- Easy to justify—less than \$100 per PC
- Easy to install
- Easy to operate
- Easy to order
- EasyLAN performs in the background.

EasyLAN's low price matches the small business user's cost-sensitive budget. It is the office network solution for less than \$100 per PC including cables and software. At this price, the RISK IS LOW, and the BENEFITS ARE HIGH.

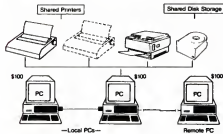
EasyLAN performs its operations concurrently in the background. EasyLAN communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3,™ WordStar™ and dBASE.™

## EASY TO OPERATE

EasyLAN network software allows PC users to share printer and disk peripherals. PCs are connected by EasyLAN cables plugged directly into your PC's standard serial communication ports and EasyLAN can be used with digital PBXs. EasyLAN supports geographically separated PCs using modems and dial-up lines.

EasyLAN's performance meets your small office requirements to move word processing documents and spread sheets between PCs. For example, EasyLAN can move a 10 page document between two PCs, as a background operation, in less than one minute!

EasyLAN loads automatically at boot time. It manages the PC's serial and parallel ports for



## EasyLAN Office Network

communications and printing. All EasyLAN operations may be started from any connected PC.

Printer sharing operates transparently with existing programs. Print files are automatically written to disk and scheduled for printing. Multiple printers per PC may be designated for specific office tasks.

For example, one PC can interface with Printer 1 for general purpose output, with Printer 2 for continuous-form letterhead stationery, and with Printer 3 for printing continuous-form invoices.

Disk sharing uses EasyLAN's COPY command, EZCOPY,™ to move files to and from PCs. Files are stored or retrieved from disk storage and the Directory is updated. The high-capacity benefits of just one hard disk can now be shared by several PCs.

All communication operations are protected by a unique password assigned to each PC so security is maintained.

## EASY SPECIFICATIONS

Each PC in the network requires an individual copy of the EasyLAN software, 128k of memory, a serial communication port(s), and DOS 2.0 or above. For your convenience, EasyLAN diskettes are not copy protected. EasyLAN runs on all IBM PC models (PC, XT, AT, and Jr) and compatible PCs.

## EASY TO INSTALL

EasyLAN can be installed in less time than it takes to enjoy your coffee break. Just plug the EasyLAN cables into existing serial ports. EasyLAN's PRINT, COPY and DIRECTORY commands are very similar to DOS commands.

## EASY TO ORDER

EasyLAN is immediately available and easy to order. For a two PC network, start with the EasyLAN Kit. For each additional PC in the network, order the EasyLAN Expansion Kit.

The EasyLAN Kits include program diskettes, manuals and cables, which are shielded to maintain signal quality. All parts are warranted for one year. EasyLAN program diskettes may be purchased individually; you supply your own cables, modem links or PBX connections.

**ORDER EasyLAN TODAY. 1-800-835-1515**

Server Technology, Sunnyvale, CA 94086 408/738-8377

Name \_\_\_\_\_

Shipping Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone (\_\_\_\_) \_\_\_\_\_

Payment: USA—Visa, MC, Check, PO No COD  
 Out of USA—US \$ Bank Draft

Name on Credit Card \_\_\_\_\_

Credit Card No. \_\_\_\_\_

Card Expires Date \_\_\_\_\_

### EasyLAN Order Form

	Qty	Amount
EasyLAN Kit—for 2-PCs: One 30' Cable, Two Diskettes, and Manuals.		Price \$179.95 \$ _____
EasyLAN Expansion Kit—for each additional PC: One 30' Cable, Diskette and Manual.		Price \$109.95 \$ _____
EasyLAN Diskette and Manual.		Price \$ 79.95 \$ _____
EasyLAN Cable—30'		Price \$ 49.95 \$ _____
Custom length cables. Call for quote.		CA resident tax 7% \$ _____
		Shipping Charge: USA \$5.00 Out of USA \$15.00 \$ _____
<b>TOTAL ORDER</b>		\$ _____

For Ordering or Configuration Help Call Toll Free

1-800/835-1515

In California call 408/738-8377 MasterCard and Visa Accepted

1095 E. Duane, 5107  
 Sunnyvale, CA 94086  
 408/738-8377

**EasyLAN**



# CRISTMAS IS NOW! QUALITY SOFTWARE FOR 'C' & C++ PROGRAMMERS

## C-TREE

### B-Tree File Manager, Source Code, No Royalties!

A b-tree can be infected with bugs, so before buying one, ask its age. In a decade of existence, this one is a real cequa. C-tree™ has been around since 1978 (it became Digital Research's Ac-

**NEW FEATURES!**  
cess Manager™). That means seasoned, sturdy code that hasn't crinkled under prolonged use of well-trodden use.

C-tree comes as C-source code, revealing all you've ever wanted to know about how b-trees are written. Provided you bind it into your binary application, you can re-distribute C-tree without royalties. And if all that is disappointing, now the good part: C-tree's design splits nodes to allow any number of users to access an in file simultaneously even when updates are in progress so that multi-user configurations and adaptation to networks are possible.

The latest version has new features: support of variable record length data files, multiple key indexes in a single physical file, MS-DOS and Unix record locking examples.

Thanks to source code which does not deviate from K&R, C-tree can travel. Binary has always meant finding a substitute file manager for yet another compiler, operating system, or computer, then change any all the function calls program wide, then starting the whole testing process anew. That's over. Tests in many environments prove that C-tree gives your application a ticket to anywhere.

C-tree permits any number of levels for a data file, supports duplicate keys, alpha, numeric or numeric, etc. etc. It's a big product with everything you'd expect. Beyond that it is intelligently designed as both a high level set of IBM routines to minimize your coding by handling all details of adding a record on its own, for example, and as low level operations which you can access directly. Either way C-tree maintains critical index structures which will find a record among a million byte keys in no more than five disk seeks.

Product Code: T060K1 Our Price  
List Price: \$395 **\$329**

## USED COMPILERS

### WELCOME

### Trade In for the Latest Model Lattice C

Has your compiler run out of gas? Has your model been discontinued? Is it falling behind for lack of new parts?

Even if yours is in good shape, you have surely noticed there are more options and accessories produced to run with the Lattice C compiler than any other. Don't wait without these additives any longer. It's time for new license plates. Trade in your current model and make it any of the compilers below and we'll send you Lattice C's most up-to-date model!

From then on you will be adopted by Lattice for full, direct support by their technical specialists.

Microsoft MS-DOS/PC-DOS C	Price <b>\$150</b>
CompuLink Innovations C86,	
Master Williams C	
Digital Research C	
Watermark C	<b>\$200</b>

## TEXT TOOLBOX

### Tackles Text Tangles

Unix™ boasts a number of muscular utilities that are migrating to the PC world. Lattice has assembled a cluster of the most useful text management tools into a single package.

"Creep" looks for text patterns in any number of files. Want all occurrences of a global variable throughout a program system? Want to search all programs in a directory down all paths to other directories, or all files on a disk? Need to find all the function calls in an entire program system? Creep can do it with a powerful expression syntax that goes far beyond your text editor's search command.

"Ed" is similar to the well-known Unix editor. It offers search and replace with "grep's" syntax, block move, read, write, delete, and that unusual facility you can extract "red" to apply a file of commands to any number of target files, even complicated changes and text additions, such as those created by "diff".

"Diff" compares text files line for line. Its output is a precise list of instructions telling what to do to make two files the same, a list which can be handed to "ed" to do Code

Text Price	Our Price
L2230	<b>\$120</b>
L2235 with Source	<b>\$100</b>

## CVUE

### Make Your Own Editor

C VUE is a low priced screen-oriented C text editor which does most of the things that a good editor should do, and boasts bill DSG 2.0 directory path name support in reading and writing files. It was written by the Lattice programmers who left forgotten by the folks who write WP software. They needed easy entry of non-display characters such as control codes and escape sequences, not footnotes, indexing and underlining, not italics, pattern searching, not spell checking. So CVUE™ was born.

CVUE only supports in memory text files, but with memory as today's prices, creating and maintaining files of over 500 K is practical. As compensation, CVUE is a very compact and fast. It actually runs in computers with only 64 K of memory and uses no tediously slow overlays.

The power of CVUE is its ease of customization. And when you take advantage of the Source Code option, the resultant editor can be made truly your own.

Code	List Price	Our Price
L2240	<b>\$25</b>	<b>\$69</b>
L2245 with Source	<b>\$120</b>	<b>\$220</b>

**TERMS AND CONDITIONS OF SALE**  
Licensees: Each price is for a license to use a product on a single computer and does not constitute ownership. We will require for each availability of multiple machine licenses at a single site. Except for those computer products may be used to create programs for distribution without royalty payments or additional licenses, provided said programs do not substantially replicate the products themselves.

Compatibility: PC BRAND's standard products are designed to operate with the IBM PC, XT or AT under PC-DOS and require no more than 128K of RAM unless indicated. Non-IBM machines using MS-DOS (it is doubtful as to total compatibility, please determine from manufacturer).

opened. Otherwise, to return a product for refund or credit, call (212) 410-4000 for required proof of purchase.

Payment: We honor MasterCard, Visa, American Express (no surcharge), western checks, in advance in NY State, and cash, and will ship COD (U.S. only) for cash, money orders or certified check (no 30 day). Purchase orders accepted from larger corporations and institutions. Our discount, terms net 30, plus a month rate penalty. Shipping and handling charges apply. 1st product \$6, each add \$3. UPS 2nd day Air 1st product \$10, each add \$4.50. UPS Next Day Air 1st product \$12, each add \$5.50. 1-2 day delivery, each add \$6. Federal Exp. Next Morning 1st product \$28, each add \$15. International Charges (letter added to order) plus shipping insured, 100 per shipping container for export or customs forms.

## PRE-C

### Through "Lint"-like Analysis Now on the PC

Unix users long for a "lint" to give programs a thorough cleaning before they disappear into a compiler.

Pre-C™ looks larger than "lint" it finds problems your compiler won't. Problems that a debugger will have trouble figuring out. Even problems which will cause trou-

ble with other compilers.

Pre-C finds all the syntactical irregularities that will blow out a compiler, even, but it goes after subtler problems, code which will never be accessed, casts with suspect conversions, variables declared as external, but never used, functions never called, obsolete usage (even C has changed), machine-dependent expressions with nil available portability.

Compilers work with one module at a time. They know nothing of other modules which only meet up at link time. Pre-C can look at all segments of your program at once and report to you any inconsistencies of inter-module references, conflicting data type declarations, parameter lists in function calls which disagree with the functions themselves in number or data type, declarations of external functions which differ from their definition.

Pre-C uses the Unix System III compiler standard to safeguard maximum portability anywhere in the C world. These are then powerful common line options to advise Pre-C what to flag and what to ignore, useful during early coding when some functions are empty or incomplete. The output of each analysis can be listed for use with subsequent Pre-C runs, so a test is not performed redundantly.

Pre-C lets you develop standing profiles of binary libraries. In any C program you subsequently write, Pre-C can use these profiles to make sure your calls to those libraries' functions are perfect. This is a big product which will work miracles in speeding large system development. 128K minimum, 192K recommended.

Product Code: P6590	Our Price
List Price	<b>\$395</b>
	<b>\$329</b>

## 30-DAY MONEY-BACK GUARANTEE

We will return the purchase price of any product in the space of if you decide it fails to meet your needs except that codes "C" by requirement of their suppliers. We want you to be completely satisfied with your purchase. Go through the materials, try out the product, and make a thoroughly informed decision whether they are right for you.

The only requirement for refund or credit is that we must receive your returned product within 30 days of its shipment, and a must on our part: it be in 100% resalable condition.  
\*\* Not shipping and handling

## SUPPORT DIRECT FROM LATTICE

Products with codes beginning "L" are all fresh from Lattice Inc., the premier software developer serving the C professional marketplace. PC BRAND has made special arrangements for Lattice to provide telephone support for these products directly.

Take advantage of this unusual opportunity. Buy from PC BRAND and you get to talk to the experts themselves!

## dBC

### Switch from dBASE Language to C for Power, Speed

There are a lot of dBASE™ file users out there. Most of them just keep data bases and use dBASE's limited reporting facilities. They're not programmers, so they don't use the dBASE programming language. But they'd like more for their efforts, and that's a business opportunity dBC™ links C to dBASE. It creates and maintains lists and their indexes which exactly replace dBASE file design. So dBASE can read and update them. And the reverse dBC can use any files created by dBASE. Now C and dBASE can operate on the same data bases interchangeably and it opens up the widespread culture of dBASE installations to exploration by C programmers. Now you can replace the resident dBASE language with the speed of C. And you no longer have to write

every line of code, as in the dBASE language, because now you've unlocked C's vast storehouse of off-the-shelf abilities and utilities.

dBC's functions parallel all dBASE's file handling commands, many of them decomposed to give you closer in control. The manual discusses each in detail, and demonstration source files on your disk show how every function is used. Use dBC for custom work for clients, or design generalized programs for manipulation and reporting of dBASE data bases.

Use dBC on its own. It's a complete dBASE manager for use with the Lattice C compiler whether or not dBASE will ever be used in tandem. has versions for all four memory models and can have sixteen index and data files open at once.

List Price	Our Price
<b>\$250</b>	<b>\$225</b>
<b>\$500</b>	<b>\$450</b>
<b>\$750</b>	<b>\$675</b>
<b>\$900</b>	<b>\$825</b>

To Order Products or Catalog, Call Us at...

# 800-CR-BOARD

That's (800) 722-7263. In NY State or Outside U.S. call (212) 410-4000.  
PC BRAND, PO Box 474, New York, N.Y. 10028  
TELEX: 667962 (SOFT COMM NYK)

Prices, terms and specifications subject to change without notice.  
© 1985 PC BRAND  
SAVE \$5  
on every code  
this code

CIRCLE 141 ON READER SERVICE CARD



# Manx Aztec C86 Join The Stampede!

*"A compiler that has many strengths...quite valuable for serious work"*  
COMPUTER LANGUAGES, 2/85

*"Easily one of the fastest compilers overall...library provides a lot of flexibility...small .EXE files"*  
DR. DOBB'S JOURNAL, 8/85

## Manx Aztec C86 - Join the Stampede!

If you are programming in C or plan to program in C for MS-DOS, PC-DOS, CP/M-86, or ROM based 8086/8088 systems, we invite you to join the stampede to Manx Aztec C86. The stampede to the most powerful, portable, and professional C development system available for MS-DOS and CP/M-86.

## Manx Aztec C86 - Power to Spare

In benchmarks published in the February, 1985 issue of Computer Languages and the August, 1985 issue of Dr. Dobbs' Journal, Manx Aztec C86 again and again came up on top in benchmarks of code speed, code size, and compile times. Dr. Dobbs' Journal declared Manx Aztec C86 the winner in the benchmarks, sharing the honor with the new Microsoft C compiler.

## Manx Aztec C86 - Unmatched Portability

Only Manx Aztec C is available for MS-DOS, CP/M-86, Apple Macintosh, AppleII, TRS-80, CP/M-80, and Commodore systems. No other C system comes anywhere close to supporting the number of microcomputer systems that Manx supports.

Manx also provides ROM development systems for 8086/8088, 68000, 8080/280, and 65xx systems.

## Manx Aztec C86 - Fantastic Features

Manx Aztec C86 is heavily bundled with special features and utilities. Features described below are for the Aztec C86-c and Aztec C86-d systems. Features that are only available with Manx Aztec C86-c are marked (-c).

**Optimized C compiler:** Unsurpassed for code quality and speed. Optionally generates 80186 and 80286 code. Full R & R.

**Symbolic Debugger:** Execution trace, break points, display data in floating point, integer, character, or hex format. Evaluate expressions. Detect illegal memory stores, modify memory registers, disassemble code.

**Manx AS86 Macro Assembler:** Supports macros, 8086, 80186, and 80286 instructions in Intel format. Fast execution.

**LN86 Overlay Linker:** Links small, large, and mixed memory model routines. Supports overlays, and options for producing ROM based code.

**Librarian:** Build and modify personal or system run time libraries.

**8087/80287 Sensing Library:** One library simulates floating point, another assumes the presence of an 8087 or 80287 math chip, the third senses the existence of a math chip, and it finds one it uses it.

**Profiler:** Provides a run time analysis of your code to pinpoint code segments to optimize.

**UNIX Library:** Compatible with UNIX C. Fast IO. Terminal IO can be buffered or unbuffered.

**DOS Library:** Time and date functions, program forking (exec), program chaining, directory commands, I/O port support, spin support, BIOS functions, and BIOS functions.

**Screen & Graphics Library:** Screen and cursor functions. Fast routines for drawing lines, circles, ellipses, points, and setting colors.

**CP/M-86 Library (-c):** Produce programs for CP/M-86.

**Large Memory Model:** Manx Aztec C86 supports programs and data of any size. Global data has a max size of 64k.

**Intel Object Option:** Interface to software that requires Intel object format, such as PLINK-86.

**Z (+v) Source Editor (-c):** Fast, powerful editor, macro capabilities, undo, ctags, buffers for commands and data, and all the bells and whistles that make it fanatics' favorite.

**ROM Support Package (-c):** Startup routine, linker options for separate placement of code and data, special utilities like the Intel HEX Utility, documentation, and library source.

**Library Source Code (-c):** UNIX, screen, graphics, and math function libraries.

**Mixed Memory Models (-c):** Mix large code and small data, small code and large data, or mix within type.

**Unifoot (-c):** The UNIX utilities make, diff, and strip.

**One year of updates (-c):** As new versions are released, updates are automatically sent.

**Technical Support:** Manx has a full time staff to provide support via telephone & bulletin board.

**Aztec C86-c Commercial System \$499**

**Aztec C86-d Developer's System \$299**

**Aztec C86-p Personal System \$199**

**Aztec C86-a Apprentice System \$ 49**

## Manx Cross Development Systems

Manx Aztec C compilers are available as native or as cross development systems for PC-DOS, MS-DOS, Macintosh, CP/M-86, CP/M-80, TRS-DOS, Apple II, and Commodore 64/128.

Cross development involves two computer systems: the development system (HOST) and the executive system (TARGET). This method is useful when the TARGET machine is slower or more limited than the HOST.

**HOSTS:** VAX UNIX (\$3000), PDP-11 UNIX (\$3000), MS-DOS (\$750), CP/M (\$750), Macintosh (\$750), CP/M-68k (\$750), XENIX (\$750).

**TARGETS:** MS-DOS, CP/M-86, Macintosh, CP/M-68k, CP/M-80, TRS-80 3 & 4, Apple II, Commodore 64, 8086/8088 ROM, 680xx ROM, 8080/8085/280 ROM, 65xx ROM.

**Additional TARGETS:** are \$300 to \$500 (non VAX) or \$1000 (VAX). Call for information, on cross development to the 68000, 65816, Amiga, C128, CP/M-68K, VRTX and others.

## How To Become a Manx-Aztec C User

Call 1-800-221-0440 or 1-800-832-9273 (800-TECHWARE). In NJ or outside the USA call 201-530-7997. Orders can also be telefaxed to 495-8512. Payment can be by check, C.O.D., American Express, Visa, MasterCard, or Net 30 to qualified customers.

Orders can also be mailed to Manx Software Systems, Box 55, Shrewsbury NJ 07701.

For More Information: call 1-800-221-0440, or 201-530-7997, or write to Manx Software Systems.

## Support Software for Manx Aztec C86

Discounts are available on many items listed below. Call Manx for details.

**C-tree \$395:** B-tree database system. Easy to use. Available for Aztec C for MS-DOS, Macintosh, CP/M-86, CP/M-80, and others. Includes source.

**PHACT \$250:** Powerful database system. Available for Manx Aztec C compilers for MS-DOS, CP/M-86 and CP/M-80.

**PANEL \$295:** Create screens via simple, powerful editing commands. Select colors, edit fields, Directly input data to a multi-keyed file utility.

**ScreenScreen \$99:** Create and modify formatted screens easily. Validate fields, select colors, create screens for both the color and monochrome cards. With library source ScreenScreen is \$299.

**Windows for C \$195:** Versatile window utility that supports IBM PC compatible and some non-compatible environments.

**HALO \$250:** The ultimate C graphics package. It supports viewpoints, shapes, and multiple graphics cards. A less expensive version is available for just the PC mono and color cards.

**PinFirm \$295:** Syntax checking while you edit greatly shortens compile time.

**Pre-C \$395:** Powerful Link-like utility locates structural and usage errors. Easily checks multiple files for bad parameter declarations and other interface errors. Link users will find the user interface a dream come true.

**PC-LINT \$98:** Link-like utility that supports large memory models, has clear error messages, and executes quickly, has lots of options and features that you wouldn't expect at this low price.

**Greenleaf Functions \$185:** Source for over 200 C and assembler functions.

**C Utility Library \$185:** C and assembler source for screens, windows, color graphics, asynch communications, and more. The color graphics and speed of this package are impressive.

**PLINK-86 \$395:** MS-DOS linkage editor for producing and maintaining overlaid programs. It works with Aztec C86 in Intel object format mode.

## Discounts

Discounts are available to professors, students, small businesses, and consultants. A discount is also available on a "trade in" basis for users of "brand x" C compilers. Call Manx for details.

## 30 Day Satisfaction Guarantee

Any Manx Aztec C system can be returned within 30 days for refund if you are not satisfied with your purchase. Only systems shipped within the USA by MANX directly to the end user are eligible for return. Refunds will not include shipping costs and a small restocking fee may be charged.

## Distribution of Manx Aztec C

In the USA, Manx Software Systems is the sole and exclusive distributor of Aztec C. Any telephone or mail order sales other than through Manx are unauthorized. Manx Aztec C is sold at some retail outlets under license to Manx.

**MANX**

To order or for information call

**800-221-0440**

MANX is a registered trademark of Intel Corporation, Leland H. Latimer, Inc., Cross-Tek Personnel, Inc., PHACT TM PHACT 8800C, D-Optimizing C86 TM Computer Innovations, Inc., MACINTOSH APPLE TM APPLE, INC., PASCAL PLUS 86 TM THE PROCTER, MACRO TM Macintosh Computers, Inc., Greenleaf TM GREENLEAF Software, Westman, SunScreen TM SunSoft, PANEL TM Panel Computer Systems Ltd., WINDOWS FOR C TM Creative Solutions, XENIX, MS-DOS TM MICROSOFT, INC., CP/M TM CP/M, AMIGA, C86, C128 TM COMMODORE, INC.

CIRCLE 348 ON READER SERVICE CARD

Actually, we give you two things free.

Our source code. And your freedom.

Just buy part or all of our excellent integrated business accounting system, the SBT Accounting Software Library.

We'll give you our source code absolutely free.

Which, in turn, gives you the freedom to customize our software to fit your business needs.

Say, for instance, you want to change the way a management report is formatted. Our free source code enables you to change it.

What's more, the change will be quick and simple because our software is written in easy-to-use dBASE.

In fact, the entire SBT Accounting Software Library runs with dBASE III or dBASE II\*, so you get the power and flexibility of those best-selling programs. Plus the freedom to use any computer that runs dBASE.

The SBT Accounting Software Library. Great software and freedom. All in the same box.

Call today for our demo disk and brochure.  
(415) 331-9900.

**THE SBT ACCOUNTING SOFTWARE LIBRARY.**

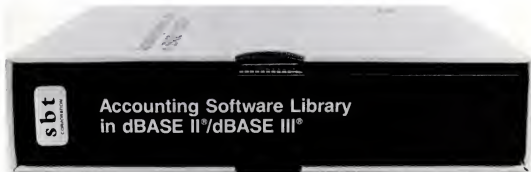
dProfessional	Time & Billing	\$395
dOrder	Sales Order Processing	\$195
dInvoice	Billing/Inventory Control	\$195
dStatement	Accounts Receivable	\$ 95
dPurchase	Purchase Order	\$195
dPayable	Accounts Payable	\$295
dPayroll	Payroll/Labor	\$395
dLedger	General Ledger/Finance	\$395
dAssets	Asset/Depreciation	\$195
dProject	Project/Job Accounting	\$395
dBackup	Menu/Backup	\$ 65



Three Harbor Drive  
Sausalito, CA 94965  
(415) 331-9900

Call today for the name of the SBT consultant  
in your area.

# Free source code in every box.



\*Compiled versions are also available. dBASE III and dBASE II are registered trademarks of Ashton-Tate, Inc. Copyright 1985, SBT Corporation.

**CIRCLE 470 ON READER SERVICE CARD**



# Working With You To Stay Ahead.

## PC PROGRAMMERS CORNER

Borland	
Turbo Pascal (v.3.0)	\$ 45
CompuView	
Vedit	\$130
Vedit +	179
Digital Research	
Specials	
Concurrent CP/M	
w/Windows	\$115
DR Assembler &	
Tools '86	125
Fortran 77 - Dos	295
C Basic Comp. 86	355
Concurrent PC	
Dos (v.4.1)	239
New Products	
Gem Draw	\$105
Gem Desktop	39
Emerging Technology	
Edix (editor)	\$139
Morgan Computing	
Prof Basic	\$ 79
Trees 86	99
Peter Norton	
Norton Utilities (v.3.0)	\$ 59
Supersoft	
Fortran	\$209

## SOFTWARE

### SPECIALS

Open Systems	
All Accounting	
Programs	\$335
Software Group	
Enable	\$419
Alpha Software	
ESP	\$499

Alpha Software	
Electric Desk (PC)	\$209
Electric Desk (Jr.)	199
Ashton-Tate	
d-Base II	Call
d-Base III (v.1.1)	Call
Framework	Call
Friday	\$179
A.T.I.	
All Training	
Programs	Call
BPI	
Personal Acct'g.	\$ 69

Borland	
Side Kick	\$ 37
Sidekick	
(unprotected)	69
Turbo Pascal (v.3.0)	45
w/8087	75
Superkey	55
Cdex	
All Training	
Programs	\$ 49
Central Point	
Copy II PC	\$ 34
CompuView	
V-Print	\$ 99
V-Spell	99
Connecticut Software	
Printer Boss w/Letter	
Boss and Sideline	
NEW (v.5)	\$ 99
Consumer Software, Inc.	
Spread Sheet Auditor	(v.2.0) \$109
Decision Resources	
Diagram Master	
New	\$279
Chart-Master	215
Sign-Master	159
Digital Marketing	
Grammatik	\$ 60
Proofreader	42
Dow Jones	
Market Analyzer	\$229
Membership Kit	25
Emerging Technology	
Wordix (formatter)	\$ 319
Prof Writers' Pkg.	\$ 319
Enertronics	
Energraphics	\$209
w/Plotter Option	269
Fox & Geller	
Quick Report	\$169
GUI II or III	75
Quickcode II or III	169
Funk Software	
Sideways	\$ 49
FYI	
FYI 3000	\$259
Sort	99
Hervend Software	
Project Manager	\$249
Total Project Mgr.	279
Hayes	
Smartcom II	\$ 95
I.M.S.I. - PC Paintbrush	
w/Microsoft Mouse	\$219
Innovative Software	
Smart System	\$490
TIM IV	169
Other Products	Call
Lifetree Software	
Volkswriter Deluxe	\$155
Volkswriter	
Scientific	299
Living Videotext	
Think Tank (256K)	\$119

This is only a sample of the nearly 10,000 products we carry. If you're interested in something that is not listed, PLEASE CALL!

And don't forget to ask our sales people about our unadvertised specials.

# 1 800 826-1589

WITHIN WISCONSIN **1 800 472-3535**

INT'L TELEX: 260181 ORYX SYS WAU

Technical Support/Order Status/Custom Service:  
Call (715) 848-1374.



MDBS, Inc.	
K Graph	\$139
K Text	109
K Paint	65
K Report	139
K Mouse	69
Knowledge Men	256
Memio Corp.	
In-Search	\$319
MicroPro	
VS ProPak (WS,	
CS, MM, SI)	\$255
Wordstar	175
Wordstar 2000	255
Wordstar 2000 +	295
Microfilm	
R-Base 5000	\$389
R-Base Cloud (v.2.0)	159
Report Writer	95
R-Base - 4000	265
Microsoft	
Macro Assembler	\$109
Business Basic	
Compiler	269
Flight Simulator	39
C Compiler	199
Chart	159
MuMath/MuSimp	
(DOS)	179
Personal Compiler	225
Project	169
Multipan	
(MS/DOS) (v.1.20)	129
Word (v.2.0) (DOS)	229
Others	Call
Microsoft	
Crosstek (DOS)	\$ 99
Crosstek (CPM)	109
Remote	119

Morgan Computing	
Professional Basic	\$ 79
Multimate Systems, Inc.	
Multimate (v.3.3)	\$229
Oesle	
Word Plus	\$110
Punctuation & Style	99
Office Solutions	
Office Writer	Call
Paladin	
Flashcalc	Call
Peechtree Software	
Back to Basics	
Acct'g System	\$219
Peechtree 4	
(GL, AP, AR)	229
Acct'g Module	359
Practise Hall	
VCN Execuvision	\$259
Quadram-Quadsoft	
Tax Strategist	\$209
Investment	
Strategist	209
4-1-1 Retrieval Syst.	99
Deadline Mgr.	99
Data Base Mgr.	139
Select Write	
Vid Proc 101	69
Freestyle	199
Day II	69
Starline	
Kid/Symphony	89
Guide to Writing	
Business Plan	39
Reesoft	
Prokey (v.4.0)	\$ 89
Samra Corp.	
Word III	\$329
Samra +	449

SPI Open Access	\$ 319
Satellite Software	
Personnel Word	
Perfect	\$119
Word Perfect w/Sp.	255
Word Perfect Jr.	49
Others	Call
Sanable Designs	
d Programmer	\$199
Softcorp. Inc.	
PRO-JECT 6	Call
Softart	
Fancy Fonts (v.2.0)	\$135
Softstyle	
Printworks	\$ 49
Software Arts	
TKI Solver	\$265
Spotlight	109
Software Publishing	
(Jr. Compatible)	
PFS: File, Graph, Plan,	
Write, Access	\$ 77
PFS: Report	\$ 72
Sortcut, U.S.	
Acctg. Mod.	\$399
Supercalc III	259
Star Software	
Accounting Partner	\$219
Acctg. Partner II	309
Other Products	Call
Thoughtware	
Trigger	\$329
Warner Software	
(Jr. Compatible)	
Desk Organizer	\$63



## BOARDS

### SPECIALS

Quadram  
Quadboard 64K (Cik/Cal, S & P) ..... \$199  
w/384K ..... 244  
(regularly \$299 w/384K)  
Microlog - Baby Blue II ..... \$519

#### AST Research

Six Pak Plus 64K (S & P, Cik/Cal, exp. to 384K) ..... \$229  
MegaPlus 64K (Cik/Cal, S Port) ..... 269  
(512K cap w/MegaPlus)  
Megapack 128K ..... 245  
Megapack 256K exp. Call  
Monograph Plus ..... Call  
CC-232 ..... 289  
Preview Bd. .... 267  
Advantage (AT) ..... 449  
DCA  
Irma Board ..... Call  
Hercules  
Color Card ..... \$195  
Graphics Board ..... 329  
Koele  
Touch Tablet ..... \$ 99  
Waynard Electronics  
Floppy Drive Contr. .... \$119  
w/Port ..... 169  
w/Ser Port ..... 179  
Sandstar ..... Call  
Microlog  
Baby Blue CPU + ..... \$325  
Paradise  
Modular Display Card ..... \$285  
Quadram  
MicroZarray Stack Printer  
-PIP 8K ..... \$139  
-SP 8K (exp 64K only) ..... 149  
-SIS 8K (exp 64K only) ..... 149  
Quadcolor I ..... 199  
Quadcolor II ..... 389  
Quadlink 64K Mem. .... 385  
Quadboard Silver ..... Call  
Quadboard Gold ..... Call  
Quadport AT ..... Call  
Quad Liberty ..... Call  
Palette Master (256 colors) ..... 499  
Quadgraph (monographs) ..... 379

Quadram cont.  
Quadview (P, S, Cik/Cal, Soft Font, w/Ed 5th, 269  
Quadaprint (doubles proc speed  
PC or XT) ..... 489  
All Other Products ..... Call  
Tecmar  
Graphics Master ..... \$479  
Captain ..... 199

## PC NETWORKING

Please call our Technical Department for specific configurations. We have the following available:  
AST/3 Com/Quadram  
Novell/Conrus

### MODEMS

#### SPECIAL

Hayes  
Smartmodem 1200 \$378  
Hayes  
Smartmodem 300 ..... \$159  
Smartmodem 1200B 369  
Smartmodem 2400 ..... Call  
Novation ..... Call  
Quadram  
Quadmodem II ..... Call  
Quad 5251 ..... Call  
Quad 3278 ..... Call  
US Robotics  
Password ..... \$309

### PRINTERS

#### SPECIAL

Quadram  
Quadjet ..... \$395  
Epson ..... Call  
Mammaman Teily ..... Call  
NEC 3550 ..... Call  
Okidata ..... Call

Quadram  
Quad Laser - For applications that require fast turnaround time.  
Star Micronics ..... Call  
Ribbons ..... Call  
Cables ..... Call  
and much more.  
Memory Chips  
(9 chips per set of 64K) ..... \$ 18

### DISKETTES

#### SPECIAL

Ultramagnetics  
5 1/4" DS, DD (Box/10) ..... \$ 25  
BUY 3 BOXES, GET 1 BOX FREE  
3M 5 1/4" DS, DD (Box/10) ..... \$ 30  
DC 300 XL Cart. tape ..... 33  
DC 600A Cart. tape ..... 39  
Maxell  
MD2-HD diskettes for IBM-PC-AT, Box/10 \$69  
Verbatim  
5 1/4" DS, DD (Box/10) ..... \$ 30

## PC Jr ACCESSORIES

#### SPECIAL

Quadram  
Quad Jr. Exp. Chessie ..... \$470  
Keytronic  
KB 5151 Jr. .... \$169  
KB 5149 (Numeric Keypad) ..... 89  
Quad Jr. Exp. Mem (for Chessie) ..... 199  
Tecmar  
Jr. Captain (128K, C,P) ..... \$315  
Other Products ..... Call

## MONITORS

### SPECIAL

Amdek  
300A Amber ..... \$129  
Amdek  
310A ..... Call  
300 Cir ..... 265  
500 Cir RGB ..... 385  
710 Cir ..... 649  
PDS  
HX 12 RGB Color ..... \$479  
MAX 12E ..... 179  
SR-12 (690 x 480 P/Ls) ..... 639  
Doubler Card for SR-12 ..... 175  
Quadram  
Quadchrome ..... \$489  
Quadchrome II ..... 429  
Amberchrome ..... 175  
Quadscreen Hi-Res. 1449  
Sanyo  
8112 12" HR Green ..... \$169  
Taxen  
Model 420L RGB ..... \$499  
Zenith ..... Call

### DISK DRIVES

#### SPECIAL

CDC - Hall Hi ..... \$ 99  
CDC 1600 ..... \$119  
Corvus HD ..... Call  
I-Omega  
Bernoulli Box ..... Call  
1st Peak also available ..... Call  
Maynard HD ..... Call  
Maynard Electronics  
Mayneform: Portable back-up for HD System 80 (incl 1 cmfrt card) ..... \$1695  
Confrir Cde ..... ea. 175  
Cartridge 450' ..... ea. 35  
Cartridge 600' ..... ea. 45  
Shugart  
10 MB HD ..... \$389  
w/ctrlr ..... 475  
20 MB HD ..... 599  
w/ctrlr ..... 689

Mountain, Inc.  
35MB HD w/27MB tape back-up - or 35MB HD w/60MB tape back-up  
For more info ..... Call  
Velt High Disk Drives ..... Call  
Tendon  
TM-100-2 floppy ..... Call  
10 MB HD ..... \$489  
w/ctrlr ..... 669

### MISC.

#### SPECIALS

Innovative  
Flip 'n' File 50 ..... \$ 15  
Flip 'n' File 15 ..... ?

Alpha-Delta  
MACC & Surge Protector ..... \$ 69  
Computer Accessories  
Power Directors  
P12 IBM PC ..... \$145  
P22 Stand Alone ..... 75  
Electronic Protection Devices  
Lemon / EC-I ..... \$ 36  
Lime / EC-II ..... 55  
Orange / EC-IV ..... 75  
Heuppage  
8087 Chip ..... \$149  
8087 w/Software ..... 255  
80287 AT Chip ..... 269  
Other Products ..... Call  
Kensington Microware  
Masterpiece ..... \$109  
Key Tronic  
KB 5151 Dvorak ..... \$169  
KB 5151 ..... 169  
Microsoft Mouse ..... \$139  
Mouse Systems  
PC Mouse ..... \$159  
RH Electronics, Inc.  
Guardian Angel ..... Call  
Power Angel (800w) ..... Call  
Touchstone Technology  
Touchstone II (add-on keypad for the IBM) ..... \$169  
Verbatim  
Head Cleaning Kit ..... \$ 18  
Versa Computing  
VerseWriter ..... \$239



### POLICY:

- Wisconsin residents add 5% for sales tax.
- Minimum \$4.00 for shipping, handling and insurance for orders to 200.
- For orders over \$200, add 2 1/2% for shipping, handling and insurance.
- For cash prepayment of orders \$200 or more, add ONLY 2% for shipping, handling and insurance.
- Prices are subject to change without notice.
- All items subject to availability.

PCAD 102985

### WE WELCOME:

- Visa, MasterCard and American Express. (No charge for credit cards.)
- Corporate, government, educational or volume purchasers, please ask for special accounts desks for additional discount.
- COD (Add \$2.00 per box/purchase). Cash or certified check required.
- Checks, (Allow 1-2 weeks for clearing.)

### INTERNATIONAL POLICY:

We welcome foreign orders. Shipping and handling charges per order are actual shipping costs plus \$50. int'l handling fee. Canadian orders - please call. Telex: 260181 ORYX BYS WAU.

### WORKING HOURS:

Monday-Friday 8:30-6:00 • Saturday 10:30-2:00 • Central Time

Technical Support/Customer Service/Order Status: Call (715) 846-1374



T.M.

**Oryx Micro Supply**  
CRAFTSMEN OF THE NEW TECHNOLOGY

425 First Street • P.O. Box 1961 • Wausau, Wisconsin 54401

CIRCLE 381 ON READER SERVICE CARD

A Division of Oryx Systems, Inc.

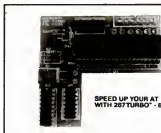
# MICROWAY'S 8087 RUNS 1-2-3™!

MicroWay is the world's leading retailer of 8087s and high performance PC upgrades. We stock a complete selection of 8087s that run at 5 and 8mhz. All of our coprocessors are shipped with a diagnostic disk and the best warranty in the business - one year! We also offer daughterboards for socketless computers such as the NEC PC and PCjr, and a board which increases the clock speed of the 80287 from 4 to 8 mhz. Our NUMBER SMASHER™ includes 512K ram. It will run the IBM PC at clock speeds up to 10mhz and achieves a throughput of .1 megaflops

with 87BASIC/INLINE, Intel Fortran, or Microsoft Fortran. Software reviewers consistently cite MicroWay software as the best in the industry! Our customers frequently write to thank us for recommending the correct software and hardware to meet their specific needs. They also thank us for our same day shipping! In addition to our own products which support the 8087 and 80287, we stock the largest supply of specialized software available anywhere. For information call us at

617-746-7341

**FASTBREAK™** . . . MicroWay's software turns on your 8087 during 1-2-3™ execution. Recalculations run up to 36 times faster. When used with the **NUMBER SMASHER™** it can provide a total increase in 1-2-3™ execution speed of up to 79 to 1. **FASTBREAK** provides you with the unique capability for running other programs on top of 1-2-3. These programs can be written in BASIC, PASCAL, Fortran or C and can access the current values in your 1-2-3 worksheet. . . . . \$79  
**FASTBREAK & NUMBER SMASHER** . . . . \$1599



SPEED UP YOUR AT WITH 287TURBO™ - 8 mhz

**NUMBER SMASHER™** The World's Fastest Accelerator Card for the IBM PC, XT, and Compatibles! Includes an 8086 and 8087 pair tested to 10mhz, and 512K bytes of high speed ram. Compatible with all software, operating systems and hardware! Your program speed is increased by a factor of 2.5 to 4.0. Floating point programs run up to 2.8 times faster on the PC than on an 80287 equipped PC AT. . . . . \$150

**MATRIXPAK™** manages a **MEGABYTE!** Written in assembly language, our runtime package accurately manipulates large matrices at very fast speeds. Includes matrix inversion and the solution of simultaneous linear equations. Callable from MS Fortran 3.3, 87MACRO, and 87BASIC/INLINE. . . . . each \$150

**87FFT™** Written in assembly language, performs Forward and Inverse FFTs on real and complex arrays which occupy up to 512K bytes of RAM. Also does convolutions, auto correlations, hamming, complex vector multiplication, and complex to radial conversions. Callable from MS Fortran, 87MACRO, C, TURBO PASCAL, or 87BASIC/INLINE. . . . . \$200

**87FFT-2™** performs two-dimensional FFTs. Ideal for image processing. Requires 87FFT \$100

## GRAPHICS PACKAGES

Grafmatic for Fortran or Pascal. . . . . \$125  
Grafmatic for Grafmatic. . . . . \$125  
Multi-Info (one language) . . . . . \$189

**Dfixer™** - Eliminates the AT hard disk problem! A disk which thoroughly checks PC or AT hard disks for bad sectors and updates the MS DOS file allocation table accordingly. . . . . \$149

**EPSILON™** - our favorite in-house editor lets you simultaneously edit up to 11 source files and concurrently run a compiler or linker. A real timesaver! . . . . . \$185

**87BASIC/INLINE™** converts the output of the IBM Basic Compiler into optimized 8087 inline code which executes up to seven times faster than 87BASIC. Supports separately compiled inline subroutines which are located in their own segments and can contain up to 64K bytes of code. This allows programs greater than 128K! Requires the IBM Basic Compiler and Macro Assembler. Includes 87BASIC. . . . . \$200

**87BASIC™** includes patches to the IBM Basic Compiler and both runtime libraries for USER TRANSPARENT 8087 support. Provides super fast performance for all numeric operations including trigonometrics, transcendental, addition, subtraction, multiplication, and division. . . . \$150

**87MACRO/DEBUG™** - contains all the pieces needed for writing 8087/80287 assembly code including 8087 macros, object libraries for commonly used functions, including transcendental, trigonometrics and conversions between strings and real numbers. Our 87DEBUG completes the package. . . . . \$199

**OBJ-ASM™** - a multipass object module translator and disassembler. Produces assembly language listings which include public symbols, external symbols, and labels commented with cross references. Ideal for patching object modules for which source is not available. . . . \$200

**RTOS - REAL TIME OPERATING SYSTEM** RTOS is a multi-user, multi-tasking real time operating system. It includes a configured version of Intel's iRMK-86, LINK-86, LOC-86, LIB-86, OH-86, and MicroWay's 87DEBUG. Runs on the IBM-PC, XT, PC-AT and COMPAG. . . . . \$400

## INTEL COMPILERS\*

FORTRAN-86. . . . . \$750  
PASCAL-86. . . . . \$750  
PL/M-86. . . . . \$500  
ASM-86. . . . . \$200

\*Requires RTOS or iRMK-86. All Intel compiler names and iRMK-86 TM Intel Corp.

For the IBM PC, PC XT, PC AT and Compatibles.

**8087 5mhz. . . . . \$109**  
Including DIAGNOSTICS and one-year warranty for IBM PC and compatibles.

**8087-3 5mhz. . . . . \$175**  
For the Tandy 1200.

**8087-2 8mhz. . . . . \$175**  
For Wang, AT&T, DeskPro, NEQ, Leading Edge.

**80287-3 5mhz. . . . . \$199**  
For the IBM PC AT and Compaq DeskPro 286.

**287Turbo™ 8 mhz. . . . . \$395**  
With Reset Button and Diagnostics.

**64K RAM Set. . . . . \$8**

**256K RAM Set. . . . . \$39**

**256K CMOS RAM Set. . . . . \$39**

**128K RAM Set PC AT. . . . . \$150**

**AST Advantage™. . . . . \$439**

**JRAM-2™ (0K). . . . . \$169**

**JRAM™ AT (0K). . . . . \$229**

**JRAM-3™ (128K). . . . . \$275**

**MAYNARD ACCENT™. . . . . \$225**

## FORTRAN, C and BASIC

Microsoft Fortran Version 3.3 . . . . . \$229

IBM Professional Fortran. . . . . \$45

Ryan-McFarland Fortran. . . . . \$99

FORLIB+ or STRINGS and THINGS. . . . . \$55

Lattice C or Microsoft C Version 3.0. . . . . \$29

FLOAT87. . . . . \$150

IBM Basic Compiler Version 2.0. . . . . \$45

Microsoft Quick Basic. . . . . \$9

Summit BetterBASIC. . . . . \$175

True Basic. . . . . \$105

## MACRO ASSEMBLERS

IBM Assembler with Librarian V. 2.0. . . . . \$155

Microsoft Assembler Version 3.01. . . . . \$125

## PASCAL and APL

Microsoft Pascal Version 3.3. . . . . \$99

Borland Turbo with 8087 Support. . . . . \$5

STSC APL+PLUS/PC. . . . . \$450

STATGRAPHICS. . . . . \$595

COSMOS Revelation. . . . . \$750

Phoenix Plink86. . . . . \$295

SPSS/PC. . . . . \$95

FASTBREAK and NUMBER SMASHER are trademarks of MicroWay, Inc. Lotus and 1-2-3 are trademarks of Lotus Development Corp.

**MicroWay**

P.O. Box 79  
Kingston, Mass.  
02364 USA  
(617) 746-7341

*The World Leader  
in 8087 Support!*

# DON'T BE A VICTIM OF LAN LARCENY

Instead, purchase the ANEX Multi-PC or Multi-AT, the alternatives to a local area network (LAN) at less than half the cost.

The Multi-PC and Multi-AT can expand your IBM-PC or AT into an easily installed DOS compatible four or eight station multi-user system. Each user can run the same or different programs concurrently and independently while sharing their data in a secure manner.

If you are planning to expand your PC environment, don't become a victim of LAN Larceny. Call ANEX today at (800) 821-4826.

**ANEX**  
A North Atlantic Company

There is no better way

151 North Route 9W, Congers, NY 10920

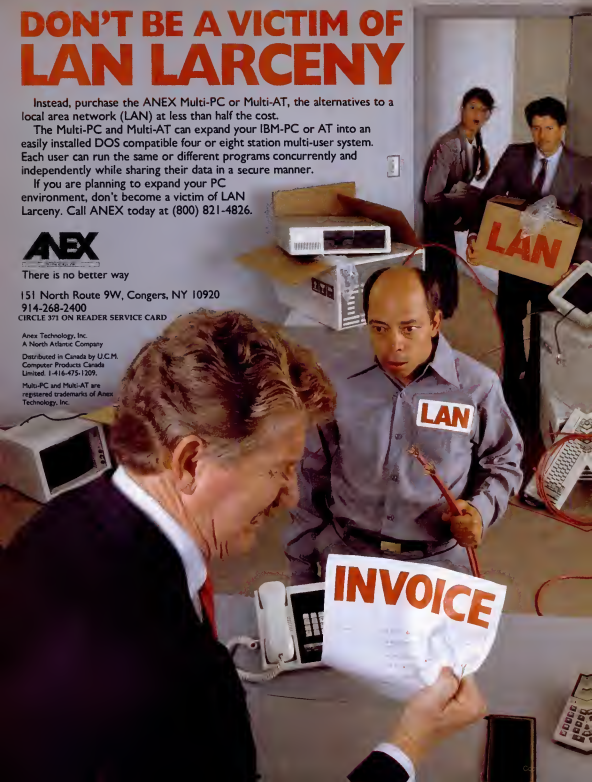
914-268-2400

CIRCLE 371 ON READER SERVICE CARD

Anex Technology, Inc.  
A North Atlantic Company

Distributed in Canada by U.C.M.  
Computer Products Canada  
Limited. 1-416-475-1209.

Multi-PC and Multi-AT are  
registered trademarks of Anex  
Technology, Inc.



# We've Heard Rumors That The Guys At HP Are Experimenting With A Way To Make Their LaserJet As Smart As Our SmartWriter.<sup>™</sup>



You can't blame them. There's a chance their customers will think they've gotten the most intelligent, most versatile desk-top-size, non-impact printer on the market.

When, in fact, they may not have heard about ours. The remarkable QMS<sup>®</sup> SmartWriter.<sup>™</sup>

Whoops! This could lead to some very embarrassing questions, such as:

"Will your LaserJet Printer support QUME<sup>®</sup>, Diablo<sup>®</sup>, Epson<sup>®</sup>, and ANSI X3.64 escape sequences? The SmartWriter will.

"Does it have more than the two standard fonts I already know about? The SmartWriter has seven.

"Does it support a parallel interface? The SmartWriter does.

"Will it intermix fonts on a line or a page without expensive options?

"Will it reverse image or bold-face fonts?

"Will your LaserJet Printer support overlays, draw lines and boxes, subscript and superscript?"

We can hear their answers now: "Uh, no." "Not really." "Not quite yet." "Sort of." "Almost. Can you wait just

a few years?"

Well, you could do that.

In fact, you could wait a long, long time for the guys at H-P<sup>®</sup> to come up with something that's got as much brain power as a QMS SmartWriter.

Or you could go ahead and get a QMS SmartWriter. Right now.

Call us at (205) 633-4300. Or write us at P.O. Box 81250, Mobile, Alabama 36689. And we'll give you a lot more information. No rumors this time. Just facts.

**QMS<sup>®</sup>**  
QUALITY MICRO SYSTEMS

WHERE IMAGINATION LEADS<sup>™</sup>

QUME is a registered trademark of Qume Corp. Diablo is a registered trademark of Xerox Corp. Epson is a registered trademark of Epson America, Inc. LaserJet is a product of the Hewlett-Packard Company. H-P is a registered trademark of the Hewlett-Packard Company. © 1985 QMS<sup>®</sup> Inc.

CIRCLE 361 ON READER SERVICE CARD

**New!**  
**Look Up!**

# For the Right Command

**Software Reference Guides — Right Above your PC:  
When You Want to Find Any Command Just LookUp!**

**Every LookUp includes all these reference guides:**

Ashion Tale	Lotus Development	Microsoft	Peachtree	Software Systems	VisiCorp
dBase II, III	Lotus 1-2-3	DOS 2.0	Peachtree 5000	Multimate	VisiCalc
Friday	Symphony	BASIC	Software Publishing	Sorcim	Communications
Framework	MicroPro	Multipan	pfs:File	SuperCalc	CompuServe
Information Unlimited	WordStar	Word	pfs:Graph	SuperWriter	The Source
Easywriter II	Multistage	Microstuff	pfs:Write	Thorn EMI	PC Talk III
Lifetree	DataStar	Crosstalk XVI	pfs:Report	Perfect Writer	
Volkswriter	CalcStar		pfs:Access	Perfect Calc	

**Special Introductory Price \$29.90**  
Buy more than one for \$25.00 each

Check the list. LookUp includes complete command summaries for more than 30 popular programs. You get them all!  
You can eliminate time wasted searching for commands; slash computer induced frustration; and unlock the full potential of your Personal Computer - with LookUp!

#### Save Your Valuable Time

You don't have to stop to hunt through those cryptic pages of documentation.  
You don't have to memorize long lists of precise command formats. No more manual shuffling. All you do is — LookUp!  
Right atop your monitor (held firmly with velcro pads) is your personal computer "crib sheet." LookUp lets you operate at full speed, all the time.

#### Eliminate Computer Induced Frustration

No more infuriating battles with personal memory problems. Put an end to distracting command searches. Keep your desk clear and uncluttered.  
You'll have a complete library of commands for all your programs - without messing up your desk. Glance up to a complete reference source that gives you the exact format of any command - without ever lifting a finger.

#### At-A-Glance Convenience

You'll wonder how you ever got along without LookUp.  
Command summaries are logically categorized so you can locate that missing command instantly.  
Handy index tabs let you select the appropriate guide quickly. LookUp's sturdy plastic easel supports a rugged three ring binder. Velcro mounting allows you to mount it wherever it's convenient.

#### Unlock Your System's Hidden Potential

Do you really use all of the commands of your favorite software package?  
Aren't there a lot of commands that you don't use because you can't quite remember the exact format necessary? Since it's never worth rummaging through those manuals, you just get along without them.  
But with LookUp above your monitor, all those commands are just a glance away.



Every LookUp includes a rugged plastic display easel and over 30 reference guides.

#### Introductory Trial Offer

We're so sure that you'll find LookUp invaluable that we're offering it at a special introductory price - and with an unconditional return policy so you can try it without any risk.  
Read this extraordinary Guarantee:

**If at any time over the next year you decide you can get along without LookUp, send it back for a 100% refund ... No questions asked.**

You've got absolutely nothing to lose. The price is reasonable. There are no hidden costs for shipping or handling. And it's easy to order. Just call our toll-free number anytime (800-772-1234), or return the enclosed coupon.

**Look Up!**

P.O. Box 34003  
Omaha, NE 68134  
(702)329-3581

#### Convenient three-ring format

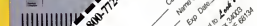
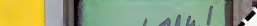


#### Organized reference guides

#### Rugged plastic display easel

#### Velcro mounting pad

#### Handy index tabs



**Call 800-772-1234 any time** Dealer and corporate rates invited

These prices include shipping. ☐ Send me one for \$29.90 ☐ Send me one for only \$25.00 each.

Name \_\_\_\_\_ Shipping address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_

Amount \_\_\_\_\_ Name on Card \_\_\_\_\_ Exp. Date \_\_\_\_\_

Payment VISA MC BankDraft Check (sorry no CODs)

Send to: **Look Up!**  
P.O. Box 34003  
Omaha, NE 68134



## Introducing the next great American success story.

The Japanese seem to have a knack for taking an existing product and improving it. Making it faster. Or more powerful. Or building in more features for the money.

Now, Sanyo has done the same thing with computers. A new line of personal computers with maximum PC compatibility.

The MBC-775 has a built-in 9" color monitor and gives you glorious 16-color graphics capabilities.

And you'll be hard pressed to find a monochrome portable that's lighter, less bulky, less expensive with as many built-in capabilities as the MBC-675.

While Sanyo's MBC-885 family of desktop computers are among the most versatile, powerful, expandable PC-compatibles available today.

All of them give you standard features that are usually options. Like an RS-232C serial port on the MBC-675. Switchable clock rates for high speed processing on the MBC-775 and MBC-885. While every model comes with dual 360K floppy disk drives, 256K of RAM (expandable to 640K), parallel printer interface, and the capability to drive both color and monochrome monitors.

As for options, there are Sanyo's hard disk drives, expansion boards, printers and monitors. All built by Sanyo to take the hard knocks of today's business world.

So call 1-800-524-0047 to find out where you can interface with the next great American success story: the new Sanyo line of PC-compatible personal computers.



**SANYO**  
Sanyo Business Systems Corporation

Sanyo Business Systems Corporation, 51 Joseph Street, Moonachie, NJ 07074 (201) 440-9000

CIRCLE 304 ON READER SERVICE CARD

# PC News

OMEGA'S NEW BERNOULLI BOX .....	37
PC ADVISER .....	38
PC UPDATE .....	43
DOWNTIME .....	54

## NEW DATABASE CHALLENGE

# Symantec's Hot Q&A Takes on PFS, dBASE

BY JARED TAYLOR

CUPERTINO, Calif. — **Question:** Can a new flat-file manager with table lookups find success in today's extremely crowded and competitive database management market?

**Answer:** Q&A can. Take a handful of the industry's senior software stars, a fresh look at the classic data management problems, and a keen perception of the market, and combine them with some of the industry's most-respected programmers and you have Symantec Corporation's dazzling new Q&A file-management program.

This hot new package is tar-

geted directly at the PFS/IBM Assistant market, and it packs quite a wallop. Q&A is an unblushing copy of PFS:FILE, hunched with a ton of slick new features, including an ambitious natural-language interface. While most software today either skimps on power to let you learn quickly or is easy to use but limited in ability, Q&A combines the best of both worlds—a package that is simple, flexible, and enormously capable.

Among those who contributed to Q&A's development are Gordon Eubanks, author of CBASIC, the first basic compiler for the PC, who is chairman of the board of Symantec;



WordStar author Rob Barnaby, and Dennis Coleman, who wrote Spellguard, the first microcomputer spelling checker. Although the company was

formed in 1982, Q&A is Symantec's first product.

Symantec has integrated its file manager with a powerful WordStar-like editor. The editor makes it vastly easier to use the database, and the program's tight integration makes it a snap to merge filed data with form letters. While the editor doesn't offer every single feature of WordStar, it does provide enough to create and edit documents with ease. In fact, Q&A's editor offers several desirable features not included in MicroPro's best-selling product, such as on-the-fly paragraph reformatting. However, Q&A's real power is in its file manager.

### Building Blocks

Building a Q&A database is just like building one with PFS:FILE. You lay out data entry forms with fields of virtually

(continued on page 35)

(continued on page 34)

## NEW DATABASE CHALLENGE

# Initial Ansa Product Spans Database Arena

Paradox boasts elements of artificial intelligence.

BY VIRGINIA DUDEK

BELMONT, Calif. — Ansa Software has announced the release of Paradox, a new

database management system that company officials say replaces traditional database syntax with a more visual, easy-to-use interface that allows faster access to databases and gives users more flexibility in combining and retrieving data.

The \$695 program's major innovation, Ansa claims, is its use of machine-reasoning, a technique that is a branch of ar-

tificial intelligence capable of solving database search problems. Instead of requiring users to write programs in a particular command syntax, as other relational databases do, Paradox can take a user's request for a search and figure out the best way to complete the task.

Richard Schwartz and Robert Shostak, both vice presidents at



## Symantec's Q&amp;A

(continued from preceding page)

any length. You enter data by tabbing from one field to the next. You call up specific records from the database by filling out a special form called a "retrieve spec," which acts as a filter. For example, if you put NY in the state field of a retrieve spec, Q&A will find all records that match that field. You narrow the search by entering criteria in more than one retrieve-spec field.

Q&A leaves PFS:FILE behind in the variety and power of its search techniques. You can search by partial string, by arithmetic operator, or by using logical OR and AND statements to retrieve all items that are green OR blue OR purple.

Nearly all Q&A search parameters can be used to screen incoming data. You can easily set up database fields that accept only the numbers between 10 and 50, for example, or that only accept the text strings "yin" and "yang." The program also lets you build lookup tables for each database, so that when you enter an income level in one field, Q&A puts the marginal tax rate in the next.

## Playing the Fields

Even more powerful is

Make a report showing the employees managers and hire dates, and show the total salaries by department.

Department	Name	Manager	Hire Date	Salary
Administration	Shift George I.		Apr 1, 1989	\$10,000.00
	Summer Jay	George Shift	Jun 16, 1990	\$13,000.00
Total:				\$14,000.00
Manufacturing	Benderly Frank	John P. Healy	Nov 1, 1985	\$12,000.00
	G. Healy John	George Shift	Jan 1, 1987	\$15,000.00
	Carney Jack	John P. Healy	Mar 1, 1987	\$18,000.00
	Yee Sue	John P. Healy	Mar 1, 1987	\$12,000.00
	Morse Elliott	John P. Healy	Apr 1, 1987	\$13,000.00
Total:				\$50,000.00

update.Btl Page 4 of 1

Esc-Cancel TD-Print ( + + + 4 July 1991 )-Javelin 4- Continue

Q&A's natural-language interface or "Intelligent Assistant," based on a built-in 400-word vocabulary, responds to user input and queries.

Q&A's "programmed" data entry. A simple programming language can make one field's value dependent on other fields. (For example: If field 1 is greater than field 4, and field 6 is equal to "Yes," then field 10 equals field 20 times field 13.) You can speed up data entry by making the cursor skip to specific fields, depending on what data you enter in previous fields. You can also do date and time arithmetic so that after a certain number of days a field can prompt, "This account is overdue."

Q&A's database reports are also an improvement over PFS:FILE's. You can design

printouts that arithmetically manipulate your data and present it in any variety of ways. It takes time to design a sophisticated "print spec," but once you've done it, you can use the same spec for different data. Finally, unlike PFS:FILE, Q&A has help screens throughout and even lets you write your own.

However, Q&A's most unusual feature is its natural-language interface or "Intelligent Assistant" (IA). IA is supposed to understand English questions like: "Who was hired after Jan. 1, 1984, with a salary of more than \$40,000?" IA comes with a 400-word built-in vocabulary, but it must be taught any special

words you're likely to use.

## Smart but Slow

When you type in a question, IA spends several seconds trying to understand it. Then it displays what it thinks you meant and waits for your confirmation before it does a database operation. It's a good deal slower than a standard database query.

Natural-language interfaces are great toys; it's fun to see what stumps them. Unfortunately, in the beta-test version of Q&A that I saw, IA was still buggy and easily baffled.

One thing that won't be a hit is Q&A's 512K memory requirement. That's a long way from PFS:FILE's 64K. Symantec will offer its own add-in 256K memory board for \$50.

At \$295, Q&A doesn't cost much more than the combined list price for PFS:FILE and PFS:WRITE. And since Q&A is a hell of a lot more program, the PFS twins could have a fight on their hands.

## Q&amp;A

Symantec Corp.  
10201 Torre Ave.  
Cupertino, CA 95014  
(408) 253-9600

List Price: \$295

Requires: 512K RAM,  
two disk drives.

## Javelin Spearheads Move for Spreadsheet Sophistication

CAMBRIDGE, Mass.—A new product, designed to fill the gaps between electronic spreadsheets, takes aim at the PC market this fall.

Javelin Software Corporation of Cambridge, Mass., is gearing up for the introduction of Javelin, a business analysis and report software program that on first trial seems capable of providing a more sophisticated tool for people who live and breathe the electronic spreadsheet.

Instead of being based on a spreadsheet format, Javelin works off a central database, or core. The user can draw from the core to configure the data

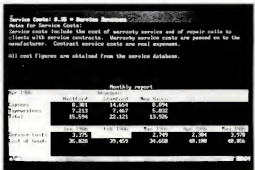
into ten different views, or formats. These include tables, formulas, worksheets, diagrams, charts, notes, errors, macros, graphs, and quick graphs. It automatically refers to business calendars and can do quarterly and yearly consolidation reports.

For example, you can design a spreadsheet format based on specifically defined formulas, then easily reference where the formulas came from. Formulas are typed in plain language, like "Total Revenues = Subscriptions + Advertising," rather than with numeric or symbolic values, and can appear in a

graph, diagram, or chart. Changing one element in the formula will result in an overall adjustment of the graph, diagram, or chart. Likewise, changing the curve in the graph

will reset the quantitative representations of data.

Several "building blocks" for constructing financial models are available to you. The roll-up feature consolidates fig-



Javelin can synchronize its notes view (top) to its worksheet (below). The \$700 program requires 512K and supports the Intel Above Board specs.



## Ansa Product

(continued from page 33)

Ansa, originally designed *Paradox* over a year ago, prompting Sevin-Rosen, the venture capital investment firm behind Lotus Development and Compaq, to invest in the fledgling Ansa last fall.

### Famous Last Words

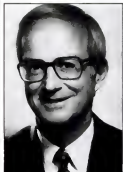
"I swore I would never fund another software program," says Sevin-Rosen partner Ben Rosen. "But *Paradox* is different enough from current software to become the next standard. It spans the database arena from entry level programs to *dBASE* and beyond."

Despite *Paradox*'s ease of use, often a sign of an unsophisticated database manager, its power could make the program a serious competitor to the three current high-performance favorites, *dBASE II*, *dBASE III*, and *Micromin's R:Base 5000*.

*Paradox*'s command line is similar to 1-2-3's. All search commands are menu generated. The database files are organized around four kinds of screen displays: tables, forms, queries, and reports. Tables, or files, are designed in rows and columns, and they can be labeled by, say, customer name, parts number, and so on.

Tables scroll horizontally to accommodate multiple columns, and the number of tables is limited only by disk space. Each individual table can contain up to 260 million characters in 65,000 rows (records) and 255 columns (fields), with 4,000 characters per row and 255 characters per column.

Forms display information



Ben Rosen swore he'd never fund another program—until he saw *Paradox*.

about one record of data at a time. In a table for a mailing list, for example, an individual form would contain information such as name and address. You can arrange the structure of the form any way you want; the cursor can be used to design boxes or to move lines of text

around the screen. Also, any changes made in the form are automatically reflected in the corresponding tables.

### Ask and Receive

Queries can retrieve, select, or perform calculations on the information in the tables. Here is where the visual aspect of *Paradox* comes in. Say you call

sales averaging, employee productivity, and more. The help screen contains the format for requesting calculations.

### Under the Table

*Paradox* includes a "script" facility that works like a keyboard macro. It can replicate keystrokes and automatically boot *Paradox* to the table that

4 [P] to include a field in the ORDER: [P] to give an Example

EMPLOYEE	Last Name	Position	Date of Hire	Sex
1	Johnson	7/14/82	131-87-3451	
2	Chandless	7/14/82	78-77-6234	
3	Christianson	1/25/83	222-88-7671	
4	Gardner	3/06/81	439-22-7871	
5	Elisabeth	6/03/80	609-23-7821	
6	Comas	6/28/86	138-88-4541	
7	James	3/05/88	299-13-5275	
8	Tilling	3/21/85	765-21-9567	
9	Lee	12/01/82	899-64-1247	
10	Muskel	3/06/83	312-98-3872	
11	Horris	6/09/81	183-77-2648	
12	Bowling	6/09/82	325-63-1928	
13	Pollock	6/09/81	712-99-6521	
14	Sampson	5/02/81	983-21-7823	

To request information from *Paradox*, users fill out a query form. Information then pops up in its Answer table. *Paradox*'s power makes it a clear *dBASE III* challenger.

to the screen three tables whose data you want to access: tables named Orders, Customer, and Stock.

When the tables are called up on the screen, the columns in each table have headings but no data listed under them. A function key inserts a check mark under the headings of the columns you want to access. If you want to combine, or join, two tables, you must have two columns in each table that are cross referenced.

Calculations and what-if functions can also be done in the query. You can enter "Quantity ordered > 50" under a column heading and receive a list of customers who have orders larger than 50 units. You can also develop formulas in the query. For example, enter "quantity" under the Quantity Ordered column and "price, calc price \* quantity" under the Unit Price column and *Paradox* will calculate the formula given and display the answer under a new table heading called Price \* Quantity.

An audit trail is automatically created so you can check your calculations. A variety of formulas are available to calculate

you want to access, sidestepping the main menu. The script names are accessible on-screen and can be edited. Errors you make while using the script facility can be corrected.

While knowledge of database syntax or language is not required to use *Paradox*, Ansa offers an optional programming language called *Paradox Application Language (PAL)*. PAL is similar to the *dBASE* language, but it is also linked to the syntax of the scripts in *Paradox*. You can write applications by using scripts to build modules and then linking them together to form programs.

The program's "like" function finds data that "looks like" a certain word.

*Paradox* can import and export files from 1-2-3, *Symphony*, *dBASE II*, *dBASE III*, *PFS:FILE* (and *IBM Filing Assistant*), *VisiCalc*, *DIF* format, and ASCII text or comma-delimited files. Files imported from outside programs are automatically converted to the *Paradox* format.

*Paradox* requires 512K bytes of RAM, two disk drives or one disk drive and a hard disk, and DOS 2.0 or later.

ures from many models into a single model by drawing an organization chart.

The time-delay chart calculates the time-delayed effects of one variable on another. A table for various rate structures, such as tax tables, is included. A curve can be drawn that specifies the relationship of one variable to another through interactive graphics. Data can be imported from other *Javelin* models by specifying a name.

Stanley Kugell, *Javelin* president and product architect, claims that *Javelin* has some of the best attributes of artificial intelligence without actually being an AI product. "It's easy for the user to express knowledge and have *Javelin* translate it. But it's not AI in that it does not second-guess you. *Javelin* takes your knowledge, incorporates it

into a model, and calculates the data according to what you tell it to do."

Preliminary response from beta-test sites has been enthusiastic. "This is what I used to do on a mainframe and have always wanted to do on a PC," says Randy George, vice president of global consumer markets at Bank of America in San Francisco. "Javelin increases the power of the spreadsheet in quantitative leaps."

"In contrast to the spreadsheet," adds Randy Dieterle, manager of user systems services at the Warner Lambert Company in Morris Plains, N.J., "Javelin gives you several ways to see data. You can perform applications in an analytical mode and study work that is subject to change.

—Virginia Dudek

# The Business Modem that speaks for itself...

"My **VOICE MESSAGE** capabilities help you stay in touch . . . with complete privacy. Personal ID codes make sure the right message gets to the right person."

"My **VOICE MAIL** system means business . . . 24 hours a day, 7 days a week. I let you take orders or exchange information from any touch-tone telephone, anywhere in the world."

"I'm a true **BUSINESS MODEM**; handling both **VOICE** and **DATA**. I'm also 100% Hayes compatible, 300/1200 Baud and use most popular communications software."



"Every business with an **IBM PC, XT, AT** or compatible needs me. I can even run in **BACKGROUND MODE** while you use your PC for other tasks."

"My **TIME MANAGEMENT** system plans your business day. On-line features include a Voice Calendar, Alarm, Auto-Dial Phone Book, and much, much more!"

Talk to Watson Yourself.  
Call 1-800-6WATSON  
(617-651-2186 in Massachusetts)  
for a demonstration.

## Watson

Voice + Data

Natural MicroSystems Corporation  
6 Mercer Road, Natick, MA 01760 617-655-0700.

CIRCLE 372 ON READER SERVICE CARD

**\$100 COUPON OFFER**  
Purchase Watson prior to November 30, 1985 and  
receive coupon worth up to \$100.00.  
See your dealer or call  
1-800-6WATSON for details.

# Downsized Bernoulli Box Adds Half-height Drives

BY CHARLES PETZOLD

ROY, Utah—The Bernoulli Box, when it was introduced in 1983, seemed to be the ideal method of mass storage on a personal computer. Unfortunately, its removable cartridge disk came in a heavy box with a footprint the size of a regular PC.

With its new half-height drive, Iomega Corporation has now decreased the footprint of a two-drive chassis by 50 percent (from 370 square inches down to 188). Its 20 megabytes of fast, reliable, removable, on-line storage in such a compact configuration are practically irresistible.

## Switch Hits

Like floppy disks, Bernoulli cartridges are easily interchangeable between different drives. (This is not always the case with hard disk cartridges.) They can be backed up with a DISKCOPY-like utility that comes with the adapter board. Most importantly, the Bernoulli Box is more resistant to shock than a hard disk and cannot crash.

Using the same 10-megabyte, 8-inch cartridges as the earlier Bernoulli Box and without any compromise in speed, the half-height Bernoulli Box is a real marvel. The squarish styling looks very much at home sitting next to a PC AT, although it can be attached to any PC or compatible that accepts PC expansion boards.

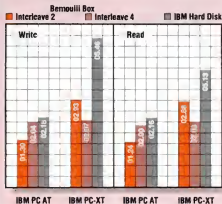
Installation is fast and easy. You need only install a ¼-size "host adapter" board inside the PC, run the cable between the board and the box, and set up a CONFIG.SYS file on your boot disk to include the Bernoulli Box device driver. (Iomega officials hinted that a bootable Bernoulli drive may be available in several months.)

## Improved Loading

The new Bernoulli half-height drives have an improved

## The Bernoulli Difference

With two different optimum settings for ATs and XT's, the Bernoulli Box has disk access speeds faster than IBM's own hard disks.



Note: Test times are given in seconds for writing and reading a 300K-byte file in ten 30K blocks. Two sets of times are shown for the Bernoulli Box because of disk-sector formatting options (interleaves). An interleave of 2 should be used with ATs, and the interleave 4 option should be used with XT.



Iomega's 12-×15-×6-inch top-of-the-line 40-megabyte half-height Bernoulli Box

loading mechanism. Instead of a sliding "barn door" as on the old Iomega models, a small latch, much like that on a standard half-height floppy disk drive, locks the cartridge inside the new box. The cartridge cannot be removed until the drive is powered down by pressing a switch just above the drive housing.

The documentation is better, too. Although still rather

skinny, it provides all the information you'll need and is packaged in an IBM-manual-size binder and box.

## Make My Day

The new half-height Bernoulli Box has exactly the same access speed as the older and larger drives (see "The Bernoulli Difference," for sample read and write times). Attached to an AT, the Bernoulli Box is faster

than the AT's own hard disk. Attached to an XT, it is faster than an XT hard disk and even a smidgen faster than an AT. If you install a Bernoulli Box on a standard PC, its performance will make you forget any thoughts you had of eventually upgrading to an XT.

The drive features different interleave settings for ATs and XT's. (Disk interleave refers to the organization of sectors on the disk track in a nonsequential order to optimize access time.) Iomega recommends that an interleave of 4 be specified for cartridges that will be used on both ATs and XT's; the interleave 2 option increases performance on the AT, but seriously degrades access on the XT. The statistics in the tests back up this observation.

Aside from solving certain mechanical problems with conventional hard disks, the Bernoulli Box provides easy answers to several perplexing business problems: Security concerns? Just lock up the cartridges at night. Large-scale data transfer between remote locations? Just mail the cartridge.

## Coming Attractions

Since half-height Bernoulli drives are now here, you may be wondering about double-density and double-sided Bernoulli drives. Iomega is working on both. Nonproduction double-density Bernoulli drives (increasing storage to 20 megabytes per disk side, large enough to completely back up an AT's hard disk) were demonstrated when the half-heights were announced. Sometime in 1986, you may see double-sided, double-density Bernoulli Boxes. How does 40 megabytes of storage per Bernoulli Box drive for a total of 80 megabytes sound to you?

### Bernoulli Box A210H

Iomega Corp.  
1821 West 4000 South  
Roy, UT 84067  
(801) 778-3000

List Price: Two 10-megabyte drives with adapter, \$3,695; one 10-megabyte drive with adapter, \$2,695.

## Dressed to the KBs

The fact that men just don't know how to dress is well documented. Ever since backskin days, as our venerable president recently pointed out, the unfair sex has relied on mothers, sisters, wives, lovers, and concerned friends to enhance its sartorial sensibilities. Now, a new program has shown that the soul of the new machine may be female.

The *Remy Martin Sense of Style Profile*, a software program that uses the IBM PC to tell men what to wear, made its auspicious debut at Boston's Jordan Marsh department store in September. The program, which is not currently available for sale to the public, and its PC are expected to stop off at the nation's swankiest department stores, as if it were Christie Brinkley or Lauren Hutton pushing a new beauty product.

The touchscreen-driven program, developed by the manufacturers of fine brandy, asks each victim questions about



body type, personality, lifestyle, and tastes. The computer then prints out a one-page fashion report tailored to the needs of the individual, all in 60 seconds.

At press time, 12 cities are on the lucky list. One can't help but feel that the computer industry, without which this would be impossible, is being neglected: The closest scheduled stop to Silicon Valley was Beverly Hills. And while readers are welcome to call Lynn Nigro at

(212) 687-1765 for the nearest location, you should be advised that the program doesn't play fair.

After inputting the data, we were told, "A padded shoulder will diminish a bulging waist. Go to the sporting-goods department and ask for the extra-large John Riggins model. Navy blue is a good color for stocky frames such as yours, and while this shade is not so common with double-occupancy tents, something there should fit." ■

## Born Yesterday

The 27-year-old ComputerLand president Barbara J. Millard is an industry success story, and she has admittedly come a long way in a short time. However, a recent biography distributed to the press exaggerated her precociousness only slightly by listing her date of birth as January 8, 1985. ■

## On the Other Hand, The World Runs On Methane

In response to a recent *Computers and Society* column ("The Digitization of Everything," *PC Magazine*, Volume 4 Number 18) in which author and contributing editor Stephen Manes asked rhetorically if the universe were analog or digital, reader William O'Brien responded in a letter, "It is neither, it's LCD. That's why you can only see it at night, when the lighting is correct." ■

### PC ADVISER EDITED BY GUS VENDITTO

#### A BASIC Solution to a BASIC Problem

I am using the AT for business programs and find BASICA extremely restrictive due to its lack of indexed files and limitations on the number of open files. Can you please give me a list of programs available for indexing files and let me know if there is a fix for the restrictions on open files?

Jay O'Brien  
Amarillo, Texas

You can solve both problems by using IBM's recently released revision of its BASIC Compiler (\$495 list from IBM Entry Systems, Boca Raton Fla.; (305) 998-2000). This new version has full ISAM support. ISAM (Indexed Sequential Access Method) will allow you to index databases. And the Compiler allows more open files.

#### Emulating an Apple

I have an IBM PC and would

### PC Adviser, debuting this issue, will help readers choose the best hardware and software to make them more productive.

like to run programs for the APPLE IIe. Can you make a recommendation as to the "best" emulation board? I understand that copy-protected programs may not run on a PC due to differences in the Apple versus IBM disk drives.

Gerard Haubrich  
Vorhees, New Jersey

Apple emulation boards for the IBM PC seem to come and go with some frequency. The one we recommend is the Quadlink from Quadram (Norcross, Ga. 30093; (404) 923-6666; list price \$495) but there are limitations on its use.

It was designed to run programs written for the Apple II and II+; the only IIe programs it will run are those compatible

with the II or II+. It also will not run programs that are copy protected or which are formatted in half-track. By the way, the board is available with a kit to adapt it for Compaq and Columbia PCs.

#### Sorting Out the Sorters

The most intriguing columns in your magazine are Programming and User to User. As a novice programmer, I find that most of the articles are of significant help to me in developing various applications programs. However, I am trying to find a fast method of sorting sequential files. I work with MS-BASIC and so far have used SHELLSORT to sort files.

Walter J. Root  
Binghamton, New York

There are several sorting programs on the market. We have two recommendations. For sorting arrays only in BASIC, there's FastSort from Ensign Software (Boise, Idaho 83704; (208) 378-8086; list price \$24.95). But for more general applications in any kind of ASCII or binary file, there's SuperSort. It was developed by Micropro, but it is now being distributed by G & B Enterprises (San Francisco, Calif. 94123; (415) 922-0876) at the greatly discounted price of \$49 plus \$5 for shipping; until recently, it retailed for \$200.

If you have a question about products available for the IBM PC, the PC Adviser may be able to help. This column, which will appear regularly, will research the question and make recommendations. Send your queries to The PC Adviser, PC Magazine, One Park Avenue, New York, NY 10016. ■

# THE ACCENT™ IS ON EXPANDED MEMORY... WITH MAYNARD'S NEW LOTUS-COMPATIBLE CARD!



Now, Maynard gives you 2MB of Lotus-compatible Expanded Memory with Accent™. Designed expressly for your personal computer, Accent™ adds memory power to Lotus 1-2-3®, Symphony®, and all other Expanded Memory programs so you can create larger spreadsheets than ever! An optional mouse places speed, access, and customized commands at your fingertips, saving time and eliminating inconvenient, multi-key cursor controls. Accent™ is available at the finest computer retail stores everywhere. Contact your local dealer or write to us today for product information.

\*Lotus 1-2-3 and Symphony are trademarks of Lotus Development Corporation.

**Accent**  
Expanded Memory Card by Maynard Electronics



**Maynard Electronics**  
Shaping tomorrow's technology.

430 E. SEMORAN BLVD., CASSELBERRY, FL 32707 305-331-6402

CIRCLE 159 ON READER SERVICE CARD

# Now there's an IBM personal printer that can play whatever you compose.



It doesn't matter if you're writing contracts or concertos; whether you print labels, librettos or on letterheads—IBM has a personal computer printer that is perfect for your needs.

If you're looking for speed, all-points-addressable graphics

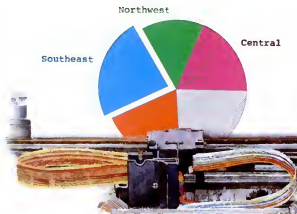
and versatile paper handling, there's the new dot-matrix IBM Proprinter. For drafts it does up to 200 characters per second (cps)

—about three pages a minute—and at 40 cps it does near letter quality. Surprisingly, the price is under \$550.

If letters are important for your business, we've got two extraordinary letter-quality machines. The IBM Quietwriter® Printer gives you high-quality printing, whisper-quiet operation and high-resolution graphics. For very sharp letter quality, easy paper handling and carbon copies, there's the IBM Wheelprinter.



**Letter-quality printing**



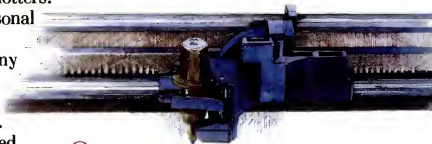
Text and color graphics

When your compositions call for color you can call upon the brilliance of the new Color Jetprinter from IBM. It combines splendid color, near-letter-quality text and the capacity to work—in color—with a wide range of the latest software. And it's also all

points addressable for virtually any kind of graphics.

Lastly, if you really do need to put notes on paper—or print floor plans or other complex diagrams—IBM offers a choice of high-resolution color plotters.

All of our personal printers attach to IBM PCs, and many attach to other leading personal computers as well. They're all designed to serve a single purpose: To give everything you do the finishing touch.



Plotter graphics

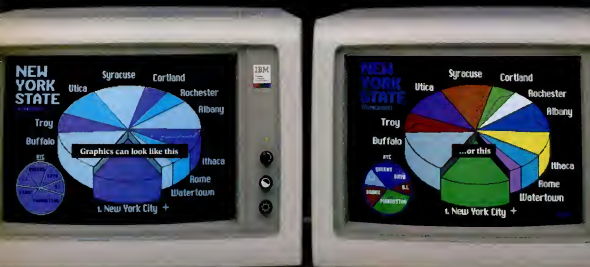
For more information call your IBM marketing representative. For free literature—or for the IBM Product Center or authorized dealer nearest you—call 1 800 IBM-2468, Ext. 141/LR.

**IBM®**

IBM Personal Printers...The Finishing Touch



# With AST A Little More Money Buys You A Lot More Color



*The Graphix Partner<sup>™</sup>  
with a standard color card*

*The Graphix Partner<sup>™</sup>  
with AST's ColorGraphPlus<sup>™</sup>*

**Announcing the more colorful color card—ColorGraphPlus.** Don't settle for dull, lifeless 4 color graphics. AST's ColorGraphPlus color card offers up to 16<sup>+</sup> sharp, vibrant colors in the standard 320 x 200 resolution—for about \$50 more than you'd expect to pay for an ordinary color card.

In the high-resolution 640 x 200 mode, ColorGraphPlus gives you up to 4<sup>+</sup> full colors. Other color cards offer only black and white.

**There's more.** ColorGraphPlus features our memory expansion option—allowing you to add even more colors—for up to 8<sup>+</sup> vivid colors in the high-resolution color mode.

We've also included a Parallel Port as standard on ColorGraphPlus, making printer and plotter connec-

tions easy and convenient. And there's a software switch, providing compatibility with our Preview!<sup>™</sup> graphics card.

**Complete IBM<sup>®</sup> color card compatibility.** ColorGraphPlus runs all the software designed for IBM's color card in the same resolutions, with at

least as many colors. And many of those application programs already support ColorGraphPlus' additional color capabilities, including some of your favorites like Symphony<sup>™</sup> by

Lotus, PC Draw, Graftalk, Business Graphics Systems, Graphix Partner—as illustrated above—and many others. **AST—number one in PC enhancements.** Because ColorGraphPlus is from AST, you're guaranteed first class quality, service and support for evolving color standards. Extensive

testing and comprehensive burn-in procedures ensure the product satisfaction you expect from the industry leader. And each ColorGraphPlus card is backed by AST's one year warranty. An optional two year warranty is also available.

To get the most color from your display monitor call our Customer Information Center (714) 863-1333. Or write, AST Research, Inc., 2121 Alton Avenue, Irvine, California 92714 TWX: 753699 ASTR UR.

\*Number of displayable colors is software dependent.  
ColorGraphPlus and Preview! trademarks of AST Research Inc. The Graphix Partner trademark of Brightwell Roberts and Company Ltd. IBM registered trademark of International Business Machines. Symphony trademark and Lotus registered trademark of Lotus Development. PC Draw trademark of Micrographix. Business Graphics Systems trademark of Proshare Software Inc. Graftalk trademark of Redding Group Inc.

**AST**  
RESEARCH INC.





## PC UPDATE BY VIRGINIA DUDEK

NEW YORK - Lotus Development Corporation has announced that future versions of 1-2-3, Symphony, and other new products will be encrypted so they can be directly installed and booted from a hard disk. The current version of 1-2-3, 1A, requires the program disk be in drive A: when 1-2-3 is booted. Version 2.0 of 1-2-3 is still slated for "early fall" release, with no exact date or upgrade price available from Lotus at press time. Symphony 1.1 has already been released. Registered users will be notified of when the hard disk version is available. A spokesperson said that a toll-free number will be widely publicized for the benefit of non-registered Symphony users.

Micro Education Corporation of America (MECA), Westport, Conn., claims to have blown away traditional checkbook/budget programs with the recently released Version 2.0 of *Managing Your Money*. It now performs several sophisticated personal finance tasks, including accounts payable with aging, 5-year budget and tax forecasting, variable fiscal-year labeling, and printing of invoices with company name and address. You can also perform buy-versus-lease comparisons, plan for your child's education, and calculate loan/mortgage refinancing analysis. Free 800-line support is available. If you purchased the \$39.95 update protection plan with the original version, you will also receive a quarterly financial newsletter authored by Tobias. Users not in the plan pay \$49.95 for the update. If you bought the old version after August 3, 1985, updates are free.

A new software standard is taking shape as IBM's Enhanced Graphics Adapter (EGA) board gathers software support. Among the converts are: Microsoft's Chart; Halo, Dr. Halo II, and Nimbus from Media Cybernetics; and future versions of Lotus's 1-2-3 and Symphony. Recent versions of DRI's GEM Draw also support the EGA.

Switch from your current database manager to KnowledgeMan/2 by MDBS of Lafayette Ind. and you could become a millionaire. MDBS is sponsoring a contest to introduce its enhanced version of KnowledgeMan, which integrates a spreadsheet, statistical analysis, and forms management with a relational database manager. A natural language interface allows you to give commands in English. Registered users of KnowledgeMan/2 who have switched from a competitive product are eligible. Send a 500-word testimonial describing why you chose KnowledgeMan/2 to: The \$1,000,000 SWITCH, 500 N. Michigan Ave., #500, Chicago, IL 60611, no later than July 31, 1986.

Short takes: AFFIRMware of Drexel Hill, Penn. released a noncopy-protected version of PC Color Spectrum, a kaleidoscopic colordisplay program. This version is called from a batch file. The display type, time of execution of the program, and display change rate, can all be specified on the command line. Updates for current users are available for \$9 plus the original disk ... DAC Software of Dallas, Tex. updated its accounting package. DAC Easy Accounting now has features that accommodate either service- or inventory-oriented accounting. Users with a DAC service contract send \$7.50 for an update. Those without the contract send \$25 plus proof of purchase. Also, Easy Accounting now retails for \$69.95, up from \$49.95 ... Natural Micro-Systems Corp., Natick, Mass., makers of Watson, an integrated voice/data modem, have added sophisticated multi-user voice-mail capabilities, remote access of Watson host system files, and support for new hardware and software. The modem also supports IBM's TopView, and its price was cut to \$300. Upgrades are free to registered Watson users. Others send \$25.

Be a contributor to PC Update. Write or call Virginia Dudek, PC Magazine, One Park Avenue, 10016 (212) 503-5265.

## New Paperback Release: Osborne's 1-2-3 Clone

BY VIRGINIA DUDEK

BERKELEY, Calif.—Adam Osborne's Paperback Software International has announced the release of a spreadsheet program described as a "1-2-3 workalike" that includes two database programs and is compatible with 1-2-3 and dBASE II files—all for the consumer-conscious price of \$99.95.

Designed by Stephenson Software of Vancouver Ltd. in British Columbia and published by Paperback, *VP-Planner* claims to offer spreadsheet us-

ers all of 1-2-3's features with a few extras. They include sparse matrix storage, a way of saving only spreadsheet cells that contain data, and an Autokey function that helps you create macros. It also offers zero column widths for hiding extraneous information and simultaneous storage of up to six windows on one worksheet.

*VP-Planner* uses spreadsheet commands that are similar to 1-2-3's, and its compatibility allows it to make use of existing 1-2-3 worksheets, templates, and macros.

### From the Top

On top of the *VP-Planner* spreadsheet are two database programs that can be accessed through the spreadsheet's worksheet. The first is a dBASE II-compatible program that uses a spreadsheet format to define fields plus read, write, update, and create dBASE II- and dBASE III-compatible files. Also included is a JOIN command that automatically retrieves records from two or more dBASE files that have common fields. Entire dBASE files, as well as groups of records, can also be read into a worksheet.

The second database, called the multidimensional database, stores spreadsheet data and asso-

ciated logic in a database format. Paperback claims two benefits. One, *VP-Planner*, can increase storage capacity because it stores worksheet information on disk without requiring multiple worksheets. Two, when recalculations are performed, the database automatically updates the appropriate totals. The multidimensional database can also define four dimensions within one worksheet.

*VP-Planner* requires 256K or more bytes of RAM, at least one disk drive, and DOS 2.x or 3.x. It runs on the IBM PC, XT, AT, PCjr, and most compatibles. An IBM or compatible graphics adapter and monitor are required to display and print graphics.

# Introducing "The Company Accountant."



Designed for the small business, The Company Accountant works for you, providing the timely and reliable information needed to develop strategies and make good management decisions.

With the GL, AR, AP, Payroll, and Inventory programs that provide over 51 easy-to-understand reports, The Company Accountant handles your small business accounting needs now and in the future.

## A system to fit your needs

The Company Accountant is built to be flexible with programs that can be tailored to your needs. The programs can be used individually or together, with each program fully explained in the clearly written manual.

The manual reviews basic accounting principles with a comprehensive tutorial, a command and report reference, and a complete glossary of accounting and computer terms.

### System Requirements

IBM PC, XT, AT or true compatible with 128K RAM; Monochrome or color monitor; DOS 2.0 or greater; 2 320K disk drives or 1 320K disk drive and 1 hard disk; Printer capable of 132 columns.

## Speed and accuracy

The Company Accountant is a fully integrated system that makes accounting fast, efficient, and accurate.

Using the double entry method with complete integration, you only enter figures once. And they are always current as of the last transaction.

On demand, The Company Accountant provides a wide variety of reports, ranging from the familiar balance sheet and income statement to customer and vendor activity, payroll information, inventory values, and stock levels.

## Double entry, plus...

- Password security
- Hard disk support
- Capacities limited only by disk space
- Creates DIF files for use with other programs
- Data compatible with:
  - Rocky Mountain Desktop Accountant
  - Insoft Accountant
  - Peachtree PeachPak 4 series
- Multiple departments, up to 99
- Customer and vendor mailing labels
- Full audit trail and control reports
- FREE telephone support

## Great price

Now double entry accounting becomes simple, reports easy and fast, and your bottom line instantly accessible. And at \$395, very affordable!

To order The Company Accountant, or for more information, pick up the telephone and call (503) 639-4907 TODAY!



**IN-HOUSE**  
SOFTWARE

12088 S.W. Garden Place  
Portland, Oregon 97223

The Company Accountant is a trademark of In-House Software

You can also request detailed descriptions of these programs with sample reports by mail. Simply fill out this coupon or attach your business card and mail to In-House Software. Your information will be rushed to you by first-class mail.

VISA, MasterCard & American Express accepted

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_



# Minolta Takes a Shot at The PC-Compatible Market

## PRODUCT REVIEW

BY ROBIN RASKIN

RAMSEY, N.J.—For its first step into the personal computing market, Minolta is placing its bets on versatility.

The Minolta PCW-1, an office workstation that retails for just under \$4,500, is for people who aren't sure what their future office needs will be. It's a self-correcting electronic typewriter, a full-featured standalone word processor, and a DOS-compatible computer in one. All the parts, which include a monitor, dual half-height disk drives, detachable keyboard, and 20-character-per-second daisy wheel printer are clamped together as an integral (35-inch) desktop unit.

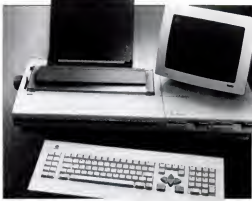
Targeted for small and medium-size businesses, the PCW-1 is billed primarily as a secretarial workstation with the focus on *TLC*, Minolta's proprietary word processing software.

Menu-driven and page-oriented, the *TLC* package includes 60 on-screen help items and a type-and-learn tutorial. The 99-key keyboard includes dedicated keys for functions like change, delete, move, and copy. The "flip" key creates a split-screen window. You can create macros and set up com-

plex document formats that can be linked to your text.

### And DOS to Boot

Unlike most dedicated word processors, the PCW-1 runs DOS programs. With Minolta's proprietary version of MS-



Minolta's Office System serves as a word processor, electronic typewriter, and personal computer.

DOS, the PCW-1 is transformed into a lookalike of a 256K-byte, dual-drive PC with a monochrome display.

While Minolta is not actively supporting third-party software, its DOS 2.11 is nearly identical to other versions of DOS, and the computer runs nearly every

application that does not require special graphics capabilities or more than 256K bytes.

The PCW-1 is based on the lightning-fast 80186 chip and comes with 256K bytes of memory. By replacing the chips, you can expand the machine to 640K. The I/O ports are limited to a printer and an RS-232 internal board option using Minolta's proprietary 16-bit bus. Clearly, the machine's

claims assemble your machine. "It turns out that installation comes with the Minolta's purchase.

### Solutions and Shackles

The Minolta parts are not only equal to the sum of the whole, the Minolta whole cannot be separated. The printer/computer unit is attached as one large workstation. This eliminates the need to search for an appropriate printer hiway or to find a corner for your atrophied but occasionally vital typewriter. But the benefits of this desktop rig are soon overshadowed by the constant 20-character-per-second rat-a-tat of its printer. And without a PC bus, the system is not expandable or easily modified.

The Minolta PCW-1 is a good machine for those businesses making the transition to computerized environments and seeking a "total solution." Unfortunately today's total solution is tomorrow's shackles. A typewriter, a dedicated word processor, and a PC-compatible computer without PC hardware compatibility is limited.

The Minolta Office System will be sold through the Minolta Corporation's Business Equipment Division and through Minolta equipment dealers. Minolta is currently planning some enhancements, including communications software, support for other printers, and an expansion box that would accommodate a hard disk. ■

hardware expansion capabilities are not compatible with the PC. The \$4,495 package, though, includes an unusual extra—in this case delivered via phone call once the review machine had arrived. "Don't assemble anything," said a Minolta representative. "Our field techni-

## Corona Slashes Prices

BY CHRISTOPHER JOHNSTON

THOUSAND OAKS, Calif.—Citing declining production costs, Corona Data Systems has slashed prices by nearly 50 percent on its desktop and portable 400 series PC compatibles.

Corona president Daniel Carter says that savings created by moving operations for the transports to Korea and stepping up desktop production in Japan have enabled the company to re-

duce its prices. "We've elected to pass our savings on," he added.

Carter announced 47 percent price cuts for the two transportable models effective July 15. The price of the PP-400-22, which has two 360K-byte floppy disk drives and 256K bytes of RAM, dropped from \$2,795 to \$1,495, while that of the PPC-400-XTA, which has 256K bytes of RAM, one floppy disk, and one 10-megabyte hard disk, dropped from \$4,295 to \$2,295. Both are expandable to

512K bytes of RAM and come with a 9-inch green phosphor monitor with high-resolution 640-by-400-pixel graphics.

Prices for Corona's desktop PCs dropped 45 percent: \$1,345 for the PC-400-12 (one floppy disk drive), \$1,495 for the PC-400-22 (two drives), and \$2,295 for the PC-400-HD2 (10-megabyte hard disk drive). All three come with 256K bytes of RAM. A 14-inch, green-phosphor, tilt-and-swivel monitor costs \$200 extra.

### PC Wrestling

Official Corona Data Systems distributors disagree on

how Corona's drastic price cuts might affect or influence industry sales.

"It's twisting our arms," said Steven Stautzenbach of Software Futures in Chicago. "Since Corona cut all its margins to distributors and dealers, we might have to get into discount wars with nothing to start with."

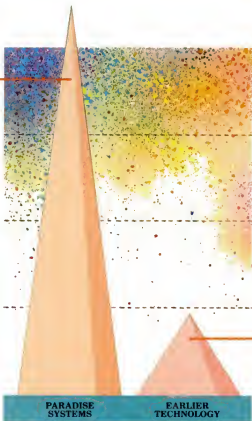
Since the PC-400s are made entirely in Korea, Stautzenbach feels that proper servicing might also pose a problem.

However, Stautzenbach concedes that the lower-price PC-400s might find new markets because of their cost. ■

*Paradise  
Makes Graphics  
Easy*

The Paradise Modular Graphics Card runs 100% of the software packages with graphics written for the IBM PC standard, on both the standard IBM monochrome and color monitors (and equivalents).

Graphics Cards using Earlier Technologies run only 20% of the software packages with graphics written for the IBM PC standard, and only on the IBM monochrome monitor (and equivalents).



## PARADISE RUNS THE SOFTWARE THE OTHER GRAPHICS CARDS DON'T



You can find the Paradise Modular Graphics Card at better IBM PC dealers. If you need more information, call us toll-free at EXT 215 (800) 527-7977 or (800) 822-2020 (inside Calif.) and we'll gladly answer your questions and send you our free "Graphics Information Pack".

**PARADISE**  
SYSTEMS, INC

## **\$50** TRADE-IN allowance on your old video card.

Paradise will send you a check for \$50 when you send us your old IBM Monochrome Card or Hercules Graphics Card with warranty registration and proof of purchase of a Paradise Modular Graphics Card. Offer expires December 31, 1985.

Trademarks: Paradise, Paradise Modular Graphics Card, Paradise Systems, Inc. Hercules Graphics Card, Hercules Computer Technology. Registered trademarks: IBM International Business Machines, Inc.

## Low power

# Complete hard disk kit \$395

Comes complete with virtually the identical controller that's in the IBM® XT, and Xerox® warranties the hard disk for one year

## Guaranteed 100 percent IBM PC compatible

How can we offer this fantastic price? Simple. We buy in such volume that even the most voracious hard disk businessmen understand they have to give us the best price possible. We could pocket the difference, but we don't.

Instead, we put the extra profit into our testing facilities. That's why Xerox guarantees our \$395 10 megabyte hard disk for one year.

Xerox knows, as our customers know, that we have an extensive testing program. Here is what we contribute toward giving you the maximum hard disk performance.

### Best Drives Available

First, we buy the best drives available. Sounds trite, doesn't it? I mean, a drive's a drive—right? Hardly. You should see some of the junk we get in our labs. Some have such high failure rates that we even questioned our own \$10,000 hard disk tester. But when we tested other manufacturers' drives we were assured that our equipment was fine, which just confirmed that the bad hard disks were not only bad—they were real bad.

But that's just the weeding out process. We then take each drive that we've put through our tester and test it again with the controller you're requested. We call this a "tested pair."

### DOS Doesn't Do It

In case you're thinking that all

this is an unnecessary duplication of what DOS does for you, let me explain the disk facts of life.

If DOS did what you may think it is supposed to do when you format the disk, DOS would map around these bad areas. Unfortunately, DOS doesn't do this.

DOS 2.0 and 2.1 can't enter the bad tracks. DOS 3.0 can, but only on the IBM AT. Unfortunately, as the press has so well documented, the AT's hard disk develops bad tracks later on.

### We do what DOS can't

We believe the problem is so bad, we use a software program that performs a powerful test of your disk drive on all of the IBM or IBM compatible computers—PCs,XTs, and ATs. Our format takes hours to analyze the disk. But when we finish, you know that the bad tracks are really mapped out so you won't write good data that will disappear into a black hole. We even send you a printed statement of our test results.

Our software allows you to type in the bad track locations from the list supplied by the manufacturers, so you'll never write good data to them—even if DOS didn't identify them you save. The software even lets you save the location of these bad sections to a file, so that you can reformat your disk without spending hours retesting.

We even include a program that will give you continuous comments on the status of your hard disk. No more waiting for that catastrophic failure.

### Average Access Time

As you might suspect, some hard disks are faster than others in their ability to move from one track of data to another. The time it takes the hard disk to move one-half way between the beginning of the disk to the end is called the "average access time."

The first generation of 10 megabyte hard disks had average access times of 80-85 milliseconds (msec). But computer users love speed, and guess what—the average access time for the new 20 megabyte hard disk in the IBM AT is only 40 msec. (We sell an AT equivalent with only 30 msec access time!)

There are some legitimate reasons for the shorter access time. It's particularly helpful when there are multiple users on the same hard disk. It's also important when running a compiler. But remember, before you get too wrapped up in the access speed, there's always that ST 506 interface which won't let data transfer from the hard disk to the computer any faster than 5 megabits/second. We've bypassed that choke hole, too. If you want the functional equivalent of a Ferrari with a turbocharger, order our 10 Mbit per second 100

### Compatibility

To be sure that your hard disk is 100 percent compatible with these IBM XT you don't need to buy the same hard disk that's in the XT. You can't even be sure what brand hard disk it is because IBM, like Express Systems, goes into the marketplace and buys hard disks from several vendors. However, they buy their XT hard disk controller from only one vendor—the same one we do.

You can buy the IBM XT controller from IBM for \$495 or you can buy from us, the functionally equivalent, manufactured by the same company that makes it for IBM for only \$195. Is it the exactly identical IBM XT controller? No, it's better. First, it takes less power, and secondly, it cannot control from 5 to 32 megabytes—the IBM controller cannot work with only 10 megabytes. It is 100 percent IBM XT compatible, and 100 percent is 100 percent. If you want to save a slot, we carry a version that lets you operate two hard disks and two floppy disk drives.

### More than 32 Megabytes

You can operate with more than 32 megabytes (the limit of DOS) through the use of "device drivers." Express Systems can supply you with device drivers for our hard disks for over 32 megabytes formatted. But, if you don't have individual files, or databases that are large, you might want to consider one of our controllers that can divide our 65 megabyte (formatted) hard disk into two equal volumes of 32 megabytes each.

### Reliability

We offer you a choice between iron oxide and plated media—the stuff that covers the hard disk and gives it its magnetic properties. Iron oxide is, well, it's rust. If you inadvertently moist your disk, you may cause the low flying head to dig out some iron oxide. A little rust flake can ruin your whole day. Plated media is more resistant to damage, and if it happens, less data is lost.

We offer both types of hard disks. The iron oxide is older



technology, and quite frankly, manufacturers understand it better. Their better understanding, combined with some of the special head locking mechanisms, gives us peace of mind when we sell you one.

### Power

Hard disks consume power. Our small, half-high hard disks consume so little power that you can use them with your existing IBM PC power supply. If you plan to use lots of slots, you'll want to increase your power supply to be safe. We offer the same amount of power for your PC that comes in the XT.

### Our Customers

Some folks just never feel comfortable buying mail order. They forget that Sears began as a mail order house or that IBM is now into mail order. But, if it helps, here is a *partial* list of customers who have felt comfortable to buy from us.

IBM	Sears
American Express	Honeywell
U.S. Army	MIT
AT&T (Bell Labs)	RCA
Bausch & Lomb	Lockheed
Xerox	Sperry

### Easy to Install

If you're like most of us, raised on the boob tube rather than the Great Books, you'd rather see the movie than read the book. Well, now you can choose to read our installation manual or for only \$9.95 more, you can get a VHS or Beta video cassette showing the simple steps for installation.



Our VHS or Beta Cassettes make installation easy.

### Warranty

We offer you a one year warranty on our hard disks—the same as IBM on the AT and 90 days on the tape drives. (It's all the manufacturer gives us.) If



### Complete Hard Disk Kits

Formatted MB	Height	Plated Media	Average Access	Transfer Rate	PC or PC/XT	AT
10	1/2	no	85 msec	5 Mbits/s	\$ 395	\$ N/A
10	1/2	yes	85 msec	5 Mbits/s	\$ 495	\$ N/A
21	1/2	yes	85 msec	5 Mbits/s	\$ 795	\$ 595
21	Full	no	30 msec	5 Mbits/s	\$ 1,535	\$ 1,340
32	1/2	yes	85 msec	5 Mbits/s	\$ 995	\$ 795
32	Full	no	30 msec	5 Mbits/s	\$ 1,775	\$ 1,575
65	Full	no	30 msec	5 Mbits/s	\$ 2,295	\$ 2,070
100	Full	yes	18 msec	10 Mbits/s	\$ 4,995	\$ 4,995

### Removable Hard Disk

10	1/2	no	90 msec	5 Mbits/s	\$ 1,095	N/A
----	-----	----	---------	-----------	----------	-----

### Tape Systems and Subsystems

Formatted Storage Capacity	Height (in)	Data Transfer Rate (K/sec)	PC or PC/XT	AT
60 Mbytes	1/2	88	\$ 995	\$ 995
60 Mbytes Subsystem	1/2	88	\$ 1,295	\$ 1,295
21 Mbytes (unformatted) Start/stop Subsystem	1/2	24	\$ 595	\$ 595
26 Mbytes Floppy Tape Subsystem	1/2	31	\$ 749	\$ 749

### Controllers

All of our hard disk and tape controllers are available separately. Please call for prices.

### Subsystem Chassis

Any of our disk or tape units are available in an external subsystem for an additional \$250.00. You can mix & match any of our 1/2 high hard disks or tape drives together or add any single full height hard disk.

### Tape Cartridges

Express Certified 555 foot 300 Hci 1/2-inch Data Cartridge \$35.00

### Power Supply

130 Watt Power supply \$75.00\*  
150 Watt Power supply \$125.00

\*with the purchase of any drive

### More questions?

Because we spend so much attention on the front end with ensuring that our disks will arrive in working order, we have a customer service department that, unlike many of our competitors, has little to do. When you need us, you won't get a constant busy signal.

Call our friendly, knowledgeable customer service staff to get answers to your questions—before or after the sale. Our people, who know the PC, can talk you through the sticky parts, and they'll respond to you quickly. Just call us.

### How to order

Pick up the telephone and call 1-800-341-7549, to order. We accept Master Card, VISA, American Express and Diners Club. Or send a cashier's check or



money order (We'll take a check, but you'll have to wait for it to clear) and tell us if you want one of our recommended configurations or you want to mix and match yourself. Corporations with a DUNS number may send purchase orders for quantities over five.



Call Toll Free 1-800-341-7549 Ext. 1200

In Illinois call (312) 882-7733 Ext. 1200

Express Systems, Inc., 1254 Remington, Schaumburg, IL 60195

CIRCLE 178 ON READER SERVICE CARD





# IF YOU THINK 60 MBYTE AUTOMATIC TAPE BACK-UP IS AN INCREDIBLE VALUE AT \$1395,



## WAIT UNTIL SYSGEN SENDS YOU THE \$100 REBATE.

The Sysgen Smart Shopper Rebate  
Sysgen Fulfillment Center  
3606 W. Bayshore  
Palo Alto, CA 94301

PAY TO THE  
ORDER OF

**SMART SYSGEN  
TAPE PURCHASER**

DATE Before 1/31/86

CHECK NUMBER  
**6805**

THE AMOUNT OF

**ONE HUNDRED DOLLARS**

TOTAL AMOUNT  
**\$100.00**

*Sysgen*

⑆ 60511 123456789010 06400 025051



Sysgen™ has made its already bestselling tape back-up for your PC, XT, AT,\* or compatible an even smarter buy.

### Automatic Back-up. Painless Data Protection.

Now you also get Sysgen's exclusive automatic tape back-up, as easy to program as a VCR! Set it once, and your Sysgen automatically backs-up your hard disk. No system demands less time or returns more consistent data security.

The new Smart QIC-File™ gives you the terrific Sysgen quality and technical support you expect. And Sysgen gives you the QIC-24 industry standard tape data format. A must. Plus automatic back-up. All this for an incredibly low price: \$1395—internal or \$1495—external.

**Buy the Smart QIC-File before Jan. 31, 1986 and Sysgen will sweeten the deal with a \$100 rebate.**

Simply return your completed warranty card with proof of purchase to the Sysgen Fulfillment Center at the address below, and we'll send you a check for \$100.\*

The Sysgen Smart QIC-File is IBM® PC compatible—including all versions of PC DOS®. It copies disk data file-by-file in automatic mode and also includes an option for manual file-by-file and mirror image back-up.

### Act before Jan. 31, 1986.

Don't miss out on the best deal in town for automatic tape back-up! For more information on Sysgen's superb line of hard disk and tape back-up products or the Sysgen dealer nearest you, call

**1-800-821-2151.**



**SYSGEN**  
INCORPORATED

\*Program begins October 1, 1985 and concludes January 31, 1986. Sales receipts dated by Jan. 31 will be honored if postmarked no later than February 28, 1986. Mail to: SYSGEN REBATE OFFER, Sysgen Fulfillment House, 3606 W. Bayshore, Palo Alto, CA 94303. Certain restrictions apply. Trademarks: Sysgen, QIC-File, Smart QIC-File, Sysgen, Inc., AT—International Business Machines Corporation. Registered Trademarks: IBM, PC DOS—International Business Machines Corporation. 47853 Warm Springs Blvd., Fremont, CA 94539 (415) 490-6770, Telex 4990643

## IBM and Microsoft Compilers: Price is the BASIC Difference

BY RICHARD AARONS  
AND JAMES LANGDELL

NEW YORK—After a wait of over 3 years, new BASIC compilers from IBM and Microsoft have appeared that share characteristics and capabilities, but a severe price disparity could give the MS-DOS manufacturer the market advantage.

Microsoft developed the central portions of both software packages, yet IBM is selling its BASIC Compiler Version 2.0 at a list price of \$495 while Microsoft's QuickBASIC Compiler is priced at only \$95.

Microsoft's pricing, a sharp cut from the \$395 list price of its old compiler, puts its product in the same ballpark as Borland's Turbo Pascal in terms of price and performance.

For an additional \$400, IBM's package includes a library manager, ISAM (Indexed Sequential Access Method) file-support modules, and a .PIF file for running the compiler under

TopView. Users of IBM BASIC Compiler Version 1.0 can upgrade to Version 2.0 in exchange for \$195 and the old manual's cover page.

The new compilers can be used on any IBM PC, XT, AT, Portable, PCjr, or "100-percent compatible" machine with at least 128K bytes of RAM and DOS 2.1. They can even produce programs specifically for the PCjr that use the sound and graphics features not available on other IBM machines.

### Tools for Living

Thankfully, the new BASIC compilers have finally caught up with 3 years worth of improvements already made to DOS and BASICA. Now the compilers can field graphics just as current versions of the BASIC interpreter do, and they can finally make use of the sub-directory, path, and environment functions that have existed since DOS 2.0.

Not content with equaling the

BASIC interpreters, the new compilers offer additional features, such as better tools for structured programming. Subroutines now can be named rather than called by line numbers. (In fact, line numbers need not be used at all in source code.) The new statements SUB, ENDSUB, and EXIT SUB designate the beginning and end of a subprogram. A CALL statement also can run an assembly language subprogram, as has been possible with the BASIC interpreter.

When you create a function with DEF FN, it no longer has to be defined in a single statement. Now, a block of several lines identified by DEF FN, END DEF, and EXIT DEF statements can be written. A function also can call on functions already defined in a program. Other new BASIC statements grant greater control over global and local variables in subroutines and functions.

Compiled BASIC programs can grow beyond the old limit of

64K. A program's code and data areas can now be 64K long, while any dynamic arrays can be stored in other portions of memory. The maximum index for numeric arrays is now 32,767 in each dimension.

### Multituser Machinations

In multituser applications running with DOS 3.0, the new LOCK and UNLOCK statements in a compiled program can restrict access to an entire file or even a single record.

The compilers now include an input editor that enables end users to modify a single line on the screen with Ctrl-key commands. The compilers support redirection of standard input and output and permit more forms of event trapping.

Fourteen new "metacommands" can be embedded in source code to give directions to the compilers. And the new COMMANDS function allows a compiled program to read parameters from the command line that invoked the program.

Though they are competent tools, these compilers still haven't fulfilled every line on a programmer's wish list. ■

## INS Applications Interface Strengthens PC Adapter Line

BY VIRGINIA DUDEK

BOSTON—Integrated Network Systems Inc. (INS) of Mobile, Ala., has announced a new software package that lets users of its PC Adapter cards communicate with IBM-compatible mainframes using DOS, assembly language, or Pascal.

Normally, you have to communicate with mainframes through specific micro-to-mainframe protocols. With the new Applications Program Interface (API), you can write batch files in DOS, or programs in Pascal or assembly language running under DOS, that can substitute for the normal protocol-based communications function. Less-experienced PC users should find communicating

with a mainframe under DOS infinitely easier.

API works with the INS PC Adapter line of micro-to-mainframe data-sharing network cards, including the 8100 PC Adapter board, which is marketed by IBM; the SDLC PC Adapter; the SDLC Loop PC Adapter; and the X.25 PC Adapter. And, the interface software will be provided to current and future board owners at no extra charge.

One possible application for this new, easy communications link is writing a program that automatically logs you onto the mainframe to retrieve electronic mail and then sends the e-mail to a file in the PC for local editing, viewing, or storage.

INS president Dennis Abbott



The API package works with the SDLC PC Adapter and the entire INS line.

adds that some customers are using API to write programs that automatically search mainframe databases for files unavailable on the PC. And two commercial micro-to-mainframe packages, Micro-Tempus's *Tempus-Link*, and Cullinet's *GOLDENGATE*, already use the interface.

INS is also offering a command interpreter that allows you

to automatically execute your prestored API programs. The interpreter instructs the PC Adapter board to execute the program as if it were an AUTOEXEC.BAT file.

With the new interpreter and interface, says Abbott, "Anything you do at the terminal, you can replace with a batch file that does the same thing." ■

"Symphony 1.1 now makes translating data from and to other programs push-button simple. It is the first program I've seen that is actually fun to install."

*Bob Horvitz, Deputy Assistant Director for Budget Analysis  
Congressional Budget Office.*

"I'm thoroughly impressed by Symphony 1.1 and glad to have it. You're going to have to use dynamite to get it out of my machine. It's almost my whole wish list in one."

*Dwight Moore, Assistant V.P., Internal Reporting  
American Medical Int'l, Beverly Hills, CA*

"In our work in financial planning and analysis we have found that Symphony 1.1 does two things. First, it allows us to build spreadsheets which are a little bit bigger than would otherwise fit in the computer...Second, in doing a spreadsheet layout design, we now have greater flexibility because of the new memory allocation."

*Ron Diderich, Manager, Financial Planning and Analysis Consulting  
Frost & Whitney, Cleveland, OH*

# LOTUS PRESENTS SYMPHONY 1.1

It was a sneak preview.

We gave advance copies of Symphony™ release 1.1—the new version of the popular five-function PC software—to some of the most sophisticated software experts. The reaction was overwhelmingly enthusiastic. Here's why:

1. **NEW EXPANDED MEMORY.** Symphony release 1.1 works with the new expanded memory boards to provide a solution to the "big data" issue, allowing users to store formulas, labels, and floating point numbers in up to 4MB RAM.
2. **NEW MEMORY ALLOCATION SCHEME.** The new

sparse matrix scheme provides greater flexibility and eliminates the need to arrange worksheets to conserve memory.

3. **MACRO LIBRARY MANAGER.** This permits the creation of libraries of macros that can be accessed from any worksheet and allows the development of multiple worksheet applications.

4. **8087/80287 SUPPORT.** Symphony release 1.1 can take advantage of 8087/80287 math co-processor chips, increasing calculation speed by up to 60 times.

5. **1-2-3 COMPATIBILITY.** New Symphony supports file translations between Symphony, 1-2-3® release 1A and

"With Symphony 1.1, Lotus has again set the industry standards so high that they'll force the rest of the industry to shoot for the same."

*R. L. Martin, Manager Decision Support Systems  
Futaba Corporation, Cleveland, OH*

"I am very excited about the memory feature. It's a breakthrough for Symphony in that it significantly broadens the universe of Symphony users."

*Robert Schultzer, V.P., Computer Systems (Corporate Finance)  
Bankers Trust Co., New York, NY*

"The Macro Library function is great. Symphony's strength lies in its command language."

*Sally Naga, Senior Information Systems Analyst  
Aermet Electronics Co., Azusa, CA*

## THE TOUGHEST CRITICS RAVE.

Jazz.<sup>™</sup> This fall, Symphony and a new version of 1-2-3 will have compatible spreadsheets, allowing the sharing of data files with no need for translation.

The critics have already acclaimed the programming potential found in Symphony's Command Language—with its conditional statements, branching and parameter passing—the Lotus<sup>®</sup> File Format and Add-In Tools. And they've praised Symphony Link<sup>™</sup>—the micro-to-mainframe Add-In. All of which makes Symphony one of the most powerful PC application development tools around.

And now Symphony is easier to learn, with a new install program and new documentation.

For your own private performance, visit your authorized Lotus dealer today.

If you already own Symphony, call 1-800-TRADE UP (in Canada 1-800-447-4700) and we'll tell you how to get your upgrade kit



**Symphony<sup>™</sup>**  
**Lotus<sup>®</sup>**

# The Sysgen Safety Net—A Backup that Never Forgets

Everyone has a few memories that wistfully creep into idle moments: the missed opportunities, the words stuck in the back of your mind or on your tongue, the times when you were too shy to introduce yourself to someone you are now certain would have been *the one*.

Perhaps the worst of missed opportunities are the precautions never taken. These are things you could easily have done but didn't because you were too busy, in too much of a hurry, or just forgetful. The unfastened seat belt. The unfastened seat belt. The hard disk backup you didn't make.

Too many people too often put off making hard disk backups until times are less hectic, forgetting that there is no time more hectic than when you have a report due in 2 hours and get a "Disk error reading drive C:" message on your display.

## Crack that Whip

The logistics of the process make missed backups understandable—though not excusable. Every backup system I know of suffers from the same fatal flaw. To gain full benefit from a backup, the system must be put to regular use, and that means following a dreaded daily routine. You're forced to spend a chunk of your day spinning disks, tapes, and your wheels preparing for the disaster that may never come.

Most of the tape-backup system manufacturers have pared precious seconds from the time needed for the daily backup routine, and they deserve our applause because the progress that they have made is astounding.

However, most of these tape

backups haven't untangled all the snarls of backing up. Even the best and fastest system can bite you hard when you turn your back on the necessary routine. Forget the warnings and forget to use your backup tools, and you'll be unprotected in a future data disaster.

## The Thrill Is Gone

After the thrill of owning a new backup system wears off and your bank account regains some of its former stature, you'll likely become lazy. Daily backups will give way to weekly backups, and eventually you'll put it off until a high-pitched squeal comes out of your hard disk and all your data instantly becomes imprisoned in the airtight and nonworking hard disk drive.

If there is an ultimate backup solution, it has to overcome the problems of human forgetfulness and mortal laziness. The system must be an automatic guardian angel, one that protects us from our own human failings.

The Sysgen Smart QIC-FILE tape backup system does just that. It sits around quietly on your desk until you go home or go to lunch. Then, without any intervention on your part, it secretly siphons your files from disk to a 1/4-inch cartridge tape. It's the first complete, tape-based automatic backup system that entirely sidesteps human error while entirely eliminating the other backup bane—wasted time. The system lacks only a robotic arm for changing tapes.

## Miracle Worker

The clever part of this little miracle is more software than

hardware. The machinery itself is a rather ordinary Wangtek cartridge tape drive in a tiny metal package, barely bigger than the half-height drive unit itself. Attached to it is an equally tiny power supply that plugs into the monochrome monitor power jack on the back of a PC.

A tiny, 5-inch-long expansion card slides into your PC, and an ordinary ribbon cable connects the drive to the card. If you have free space in your system unit, you can get the same system sans case and electricity to mount in half a drive slot in your PC or AT.

The magical software that earns my commendation is both ho-hum and amazing. Ho-hum because, if you dissect it, there's isn't one individual piece of code you could call revolutionary. And that fact makes it amazing—because no one has thought of it before.

All the software does is lurk in the background all day long, taking up about 2 or 3 kilobytes of memory and quietly reading your PC's system clock until one of the predetermined backup times arrives. If you're not using your computer for some other chore, the backup software takes over.

## Gone Streaming

While backing up, the system works about the same way as any other, running through files and packing them on tape, searching file by file rather than by the faster streaming-tape method. Thus, individual files can be recovered. Whatever speed penalty inherent in the file-by-file system (as compared with streaming tape) is completely inconsequential.

You choose when the pro-

gram makes automatic backups, which can be up to twice a day. You can omit backups on some days (weekends, for instance) and run them at different times on different days, whatever best suits your schedule.

The system can detect if you're using your computer when the appointed backup time arises, and it will sit and wait until you exit your application for DOS. You can also take manual control and back up your files whenever you want.

Of course, using the system requires that you remember to leave your computer on when you stroll away or go home for the night. You can even avoid that chore—and incidentally save a few watts—by connecting your system (should it have a built-in, battery-backed-up, time-of-day clock) to a timer that will turn it on a few minutes before the appointed backup time and off shortly after the process ends.

Alas, by eliminating the biggest argument against hard-disk-equipped PCs—the lack of a proper backup facility—Sysgen has stuck me with yet another missed opportunity. With hard disk PC sales likely to skyrocket, I regret not buying IBM stock at \$125. ■



### Sysgen Smart QIC-FILE

Sysgen Inc.  
47853 Warm Springs  
Blvd.  
Fremont, CA 94539  
(415) 490-6770  
List Price: internal model,  
\$1,395; external model,  
\$1,495  
Requires: 192K RAM,  
DOS 2.x.

## We've Put a Local Area Network on a Disk

Corporate Information Sharing. It's been described as the key to increasing a company's productivity. It's also why large networks of PC's are becoming more and more common in the workplace...In spite of the fact that they're costly, difficult to install, and incompatible with much existing software.

Finally, there's a solution to this corporate dilemma. Its name is LANLink™.

**A Software-Driven LAN That Uses Standard, RS-232 Ports.** A major breakthrough in local area networks, LANLink™ uses your computers' existing serial ports and runs under PC-DOS.

Because all of the intelligence the network requires is on the server and satellite diskettes, expensive network interface boards aren't required.

**A Powerful Network That's Cost-Conscious.** If you've been pricing board-driven LAN's, you already know that they can cost over \$4,000 per workstation. LANLink™ is different.

Boasting a data transfer rate in excess of 100,000 BPS, LANLink™ is compatible with a wide range of programs. And because special boards aren't required, installation costs are one-third that of a traditional network.

**A Network Designed the Way Business Works.** With LANLink™ you're able to customize your network along departmental lines using a data-sharing hierarchy and password-protected access.

**Get Started With LANLink™ TODAY.** Call The Software Link TODAY for complete details and the authorized dealer nearest you. The LANLink™ Starter Kit, priced at \$495, comes complete with network software for both a server and a satellite computer. For a limited time, 50 feet of RS-232 cable will be included free of charge.

LANLink™ is immediately available and comes with a money-back guarantee. VISA, MC, AMEX accepted.

# LANLink™



**THE SOFTWARE LINK, INC.**

**Developers of MultiLink™ and MultiLink Advanced™**

8601 Dunwoody Place, Suite 632, Atlanta, GA 30338 Telex 4996147 SWLINK

CALL: 404/998-0700

**Dealer Inquiries Invited**

**THE SOFTWARE LINK, INC./CANADA**

400 Ems Park Drive, Suite 18, Toronto (Markham), Ont. L3R 3K2 CALL: 416/477-5480

MultiLink, MultiLink Advanced & LANLink are trademarks of The Software Link, Inc. PC-DOS is a trademark of IBM Corp. CIRCLE 393 ON READER SERVICE CARD

*The Experts in Accessories*

# CURTIS IS THE EXPERT IN A

When it comes to computer accessories Curtis is the expert. We know how to engineer and build computer accessories that make computing better. If you have a comfort, cabling, or computer power problem,



**NEW! Crystal Power Conditioner:** Protects Against Surges and Brownouts, 4 Outlets, 7 ft. Power Cord, Power Switch, Safety Meter, EMI-RFI Filtering, 150 and 300 Watt Models, One Year Warranty, 150 Watt Model for APPLE II or Smaller, 300 Watt for IBM PCAT or Smaller.

#LC-1 Retail . . . . . \$179.95  
#LC-3 Retail . . . . . \$239.95



**NEW! AT System Stand:** Holds IBM PCAT System Unit Vertically, Occupying Less Space, Lifetime Warranty.

#SS-2 Retail . . . . . \$49.95



**Curtis Cables:** For IBM and Compatibles; Cables for Keyboards, Monochrome and Color Monitors, Totally Shielded, Lifetime Warranty.

Retail . . . . . \$8.95-\$57.95



Touch the Key and You're Static Free.

**NEW! Command Center:** Control Up to 5 Peripherals, Individually Switched, Digital Clock, Master Key Switch, Surge Protection with EMI-RFI Filtering, Static Dissipation, Built-in Circuit Breaker, 8.5 ft. Power Cord, Lifetime Warranty.

#SPF-4 Retail . . . \$179.95



**UNI-1 Universal Base:** Only 2" High, Tilts 22° and Swivels 360°, Accepts Any Monitor That Fits on a 13" Square, For Amdek, Taxon, USI and Many Other Popular Monitors, Lifetime Warranty.

#UNI-1 Retail . . . . . \$49.95





CURTIS

## ACCESSORIES.

Curtis products are the definitive answer.  
After all, we're Curtis — the experts in accessories.

Curtis products are available nationally from leading Dealers, Distributors and Retail Chains. For the Dealer or Distributor nearest you call Curtis at (803) 924-3823. In Canada: Micro-Computer Products, P.O. Box 235, Ajax, ONT., Canada L1S 3C3, (416) 427-6612.

Curtis Manufacturing Company, Inc.  
305 Union Street, Peterborough, NH 03458



**NEW! Portable Pedestal:** Tilt and Swivel Base for Compaq and IBM Portables, Tilts 22° and Swivels a Full 360°, Lifetime Warranty.

#UNI-2 Retail . . . . . \$64.95

**Adapter for Portables:** Adopts UNI-1 Base to Accommodate Compaq and IBM Portables, Lifetime Warranty.

#AD-2 Retail . . . . . \$19.95



**The Original PC Pedestal:** For IBM PC Monochrome and Color Displays, Tilts 30° and Swivels a Full 360°, Lifetime Warranty.

#PC-2 Retail . . . . . \$49.95



**NEW! Parallel Printer Cable:** 9 ft., IBM to Centronics or Compatible, Totally Shielded, Lifetime Warranty.  
#EC-6 Retail . . . . . \$29.95

**NEW! Serial Modem Cable:** 9 ft., IBM to Hayes, Novation or Compatible, Totally Shielded, Lifetime Warranty.  
#EC-7 Retail . . . . . \$29.95

**System Stand:** Holds IBM PC and PCXT System Unit Vertically, Lifetime Warranty.

#SS-1 Retail . . . . . \$24.95



**Electronic Surge Protection:** Curtis Surge Protectors Protect Sensitive Electronic Equipment from Dangerous Overvoltage Transients — Surges, Spikes and Glitches.™ Hot to Neutral and Ground Protection, Switched, LA Approved, Lifetime Performance Warranty. EMI-RFI Filtering Available.

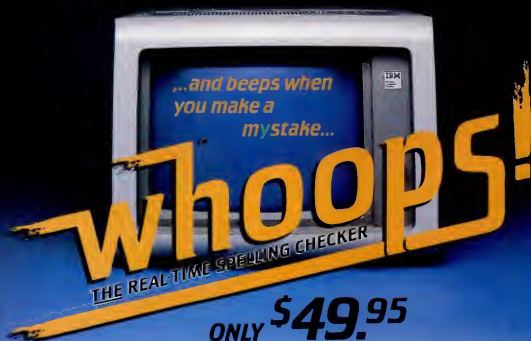
Retail . . . . . \$49.95-\$89.95

**Safe-Strip:** Six Outlets (4 w/Switched Surge Protection), 7 ft. Power Cable, Hot to Neutral Protection, One Year Warranty.

#SP-3 Retail . . . \$29.95



***CHECKS YOUR SPELLING  
AS YOU TYPE...***  
***yes, instantly, as you type each word...***



Since 1980, Cornucopia Software has pioneered in spelling and grammar checkers. Now another first, a Real-Time spelling checker.

- Works with *almost all* word-processing and spreadsheet programs including WordStar, Personal Editor, Volkswriter, PFS Write and Multimate.\*
- 50,000-word expandable dictionary.
- Runs invisibly in the background until you need it.
- Make as many copies as you need.

• \$49.95 direct-from-the-manufacturer price. (\$29.95 for copy-protected version without dictionary expansion capability, and with manual on diskette only.)

• Money-back guarantee! Try **Whoops!** for 30 days; return it if you're not completely satisfied.

**Whoops!** runs on the IBM PC and compatibles. It uses only 54K RAM when operating from disk or 182K RAM when operating direct from memory—your choice!\*\*

\*Does not work with Microsoft Word.

\*\*In addition to the memory required by your word processing program.

***Cornucopia Software - 415-528-7000***

CORNUCOPIA SOFTWARE □ POST OFFICE BOX 6111 □ ALBANY, CALIFORNIA 94706 U.S.A.

IBM and Personal Editor trademarks IBM Corp. Microsoft and Word trademarks Microsoft Corp. Multimate trademark Multimate International Corp. Volkswriter trademark Lafayette Software Inc. Wordstar trademark MicroPro International Corp. PFS Write trademark Software Publishing Corp. Whoops! trademark Cornucopia Software Inc.

# The Lowdown On the Slowdown

The computer industry is in a slump, but only temporarily. Eventually businesses will sign up for the best the industry offers—and the best keeps getting better.

At this late date, people are still asking about the downturn in the computer business. National news-magazines have devoted cover stories to it. Financial newspapers have jumped eagerly on every misstep made by computer companies. Meanwhile, companies I talk to regularly ask, "Slowdown? What slowdown?"

Sure, the personal computer business isn't going ahead at 40 to 50 percent anymore. But it is going ahead at 15 to 20 percent. There are new companies forming every day. Software start-ups are still attracting venture capital. Larger, more-powerful companies are entering the hardware business. Had it not been for the recent history of 50 percent growth, financial analysts would call the computer industry a land of investment opportunity. The analogy with the automobile industry in turn-of-the-century America is over-worked but accurate.

Granted, things are not so rosy on the mainframe side of the business. Sure, IBM can always sell a bigger mainframe to crunch the accounting department's numbers. But the companies offering alternatives to IBM are hard against the reality that they're providing solutions to problems that people don't have. Further, they have incomplete solutions to the common problems faced by medium to large companies, namely, local- and wide-area networking. Indeed, only DEC and Wang can make any claim at all to complete communications, but both are deficient at integrating PCs. The corporate communications market is so fragmented that buyers are staying away in droves, waiting for standards, waiting for someone else to be the guinea pig.

## When the Chips Are Down

As bad as the mainframe business is, the semiconductor industry is worse. But then, it has always been a mess. Frenetic prosperity followed by deep layoffs has been a semiconductor industry pattern



Bill Machrone

since the late sixties. The ups and downs of the semiconductor industry, however distant they may seem, are inseparably bound to what you or your company will do next in acquiring high-technology products.

The health of the semiconductor industry is measured by the book-to-bill ratio. This ratio is nothing more than the orders accepted to those actually delivered and billed for payment. Manufacturers who use semiconductor components are in a terrible time crunch when they introduce new high-tech products, especially if the technology isn't proprietary. Filling the supply pipeline with your company's products first is often the difference between success and ruin.

Semiconductor manufacturing is still as much an art as a science, dependent on expensive, sensitive capital equipment, so ramping up production isn't a trivial matter. The manufacturers, therefore, have a nasty habit of double- or even triple-placing their orders with different suppliers to ensure sufficient quantity and delivery schedules. This drives the semiconductor companies to distraction, and they have done everything short of violating the anti-trust laws to eliminate multiple bookings.

## Scientific Breakthrough

Technology and business are connected by a long, flexible rubber band. Technological progress is measured in two ways: quantum leaps and constant improvement. At the risk of oversimplification, it's the difference between invention and engineering.

It was a scientific breakthrough that created the first transistor, engineering that created the first integrated circuit. Likewise, scientific research gave us xerography and lasers; engineering gave us the laser printer.

So technology moves forward at two distinct speeds: the quick leap of invention and the smooth progression of engineering. Business, on the other hand, moves at one speed: like a mule up a stepladder.

Still, technology exerts an inexorable pull on business. Look at some of the battles that have been fought and won: Xerographic copiers were the hot topic in executive circles 20 years ago. The few copiers that were reluctantly given office space were jealously guarded by dour-faced administrative assistants, and "keys" billed each copy back to your cost center. Memos that detailed the shalts and shalt-

We have over 1000 software and hardware items in stock. Shipping on almost all items within 24 hours!



**FREE SOFTWARE**  
With every \$100 purchase you will receive a free diskette for your IBM PC with label maker, checker game and banner program.

Call for programs not listed

Technical & Other Info. (602) 246-2222

# TOLL-FREE ORDER LINE 1-800-421-3135

## SOFTWARE

### DATA BASE MANAGERS—

Alpha Data Base Manager	\$165
Clout 2	129
Condor III	300
Fox and Geller Quickcode	139
Fox and Geller Quickreport	139
Friday	159
KnowledgeMan	225
K Paint	60
K Graph	135
K Text	105
K Report	135
Nutshell	55
PFS: File	78
Power Base 2.1	249
RBase 5000	339
Think Tank	98
Tim IV	219

### WORD-PROCESSING—

Easy (Micro Pro)	Call
Leading Edge w/Merge	85
Microsoft Word	225
Multimate	Call
Oasis Word Plus	85
Peachtree 5000	145
PFS: Write	78
Random House Spell Checker	36
Samna III 3.0	275
VolksWriter Deluxe	139
Word Perfect 4.0	195
Wordstar	170
Wordstar Prolog	239
Wordstar 2000	238
Wordstar 2000+	285

### SPREADSHEETS—

Microsoft Multiplan	110
PFS: Plan	78
Supercalc II	145
Supercalc III 2.1 (New)	169

### ACCOUNTING—

BPI Accounts Payable	299
BPI Account Receivable	299
BPI General Accounting	299
BPI Payroll	299
Cyma	Call
Dollars and Sense	85
MBSI	Call
Tobias Managing Your Money	95

**TCS. Big Four equivalent of Peachtree Series 4 -** Specially augmented and customized for your IBM PC Terminal and Printer - GL, AR, PA, AP, CP/M-80, CP/M-86 for PC XT, DOS 1.1, 2.0.  
Each Module \$65 For All Four \$249

### INTEGRATED—

Enable	Call
Smart Software	Call

### TRANSFER PROGRAMS—

Crosstalk XVI	90
Hayes Smartcom	88
Move-It	79
Remote	99

## SOFTWARE

### GRAPHICS—

Chartmaster	\$220
Dr. Halo	65
Energraphics w/o Plotter	170
Energraphics w/Plotter	220
Fontrix	99
Graphwriter/Combo	310
Microsoft Flight Simulator	32
PFS Graph	69
PFS Graph	78
Signmaster	145

### LANGUAGES—

Concurrent PC/Dos	179
CP/M 86	35
Fortran 77	208
Lattice C Compiler	245
Lattice Run C Interpreter	89
Microsoft Basic Compiler	235
Microsoft C Compiler	239
Microsoft Fortran	209
Microsoft Macro Assembler	89
Microsoft Pascal Compiler	179
Microsoft Quick Basic	65
Multi Halo	140

### PROJECT MANAGEMENT—

Harvard Project Manager	199
Microsoft Project	150
Total Harvard Project	245

### UTILITIES—

Copy II PC	22
Copywright	45
Norton Utilities 3.0	52
Prokey 4.0	75
Superkey	36

## HARDWARE

### BUYS OF THE YEAR

Expansion Board 0 to 576K	\$69
KB5151 Keyboard Equivalent	\$89
Hercules Graphic Board w/Par Port Equivalent	118
1 Year Warranty - 30 Day Return Privilege	

### MODEMS—

Anchor Express	245
Hayes 1200	Call
Hayes 1200B w/Software	Call
Hayes 2400	605
Promodem 1200B w/Software	265
Promodem 1200	309

### RAM—

64K 150NS Chips (Set of 9)	4.95
256K Ram Chips (Set of 9)	35

### BOARDS—

AST Advantage	385
AST Sixpack	Call
Hercules Color Card	145
Hercules Graphics Card	275
Paradise Five Pak w/64K	155
Paradise Modular Graphics Card	249
Quadram Board with Par/Ser and Game Port	199
Quadcolor I	185
Sigma Maximizer Multifunction	169
Sperdy 512K Expansion w/128K	145

## HARDWARE

STB Chaffeur Board	\$255
STB Mono Board	155
AB Print Switch	75

### COMPUTERS—

Sperry PC Mono 256K Dual Drive Serial Port, Clock, MS/DOS 2.11	1650
IBM PC-AT	Call
ITT Computers PC Compatible 256K Dual Drive, Mono, MS/DOS	1395
Zenith 158	Call

### PRINTERS—

#### FREE! PRINTER SET SOFTWARE

Purchase an Okidata, Epson, Gemini, Citizen or Toshiba printer and receive at no charge a menu driven program to set print characteristics or to make your computer function as a correcting typewriter. Retail value \$35. Available for most disk formats

CITIZEN	
MSP-10	259
MSP-15	359
MSP-20	329
DAISYWRITER 2000	795
EPSON - Call on all models	
JUKI	
Juki 8100	349
Juki 6300	685
Juki Tractors	120
NEC	
3550	969
8850	1299
P5 Parallel	Call
OKIDATA - Call on all models	
PANASONIC	
1091	239
1092	349
1093	429
KXP3151	410
SILVER REED	
EXP 400P	205
EXP 500P	279
EXP 550P	389
EXP 770P	689
STAR MICRONICS	
SG-10	Call
SG-15	369
Call for prices on other models	
TOSHIBA	
1340	540
P351	1020

### MONITORS—

AMDEK	Call for price
Taxan 420	399
Taxan 121 Green	135
Taxan 122 Amber	125
Princeton HX-12	445
Princeton Max 12	170
Sensung TTL, Amber	119

**TERMS:** Prices include 3% cash discount. Add 3% for charge and C.O.D. orders. Shipping on most software is \$5.00. A2 orders +6% sales tax. Personal check - allow ten (10) days to clear. Prices are subject to change

TOLL-FREE ORDER LINE 1-800-421-3135

WAREHOUSE DATA PRODUCTS

2701 West Glendale Ave. • Phoenix, AZ 85021



notes of copier use circulated, adorned with important signatures. Today, if you don't get the kind of copy machine you want from the office services group, you go out at lunchtime with your credit card and put it on your next expense report.

Then the personal computer happened. Middle managers visited arcane places called computer stores after work and came back believers. Hardware and software that would do useful business work was around as early as 1979, but it took businesses a couple of years to get the message. The early CP/M machines were the choice for word processing, while the Apple II was the spreadsheet champ. End users fought the inevitable uphill struggle against MIS and top management, and eventually won.

Then the exception that proves the rule happened: IBM introduced a slow, expensive, low-capacity machine called the PC. Businesses laid back, put a hand over their eyes, and said, "Take me!"

#### The Stretch

Now we're in one of those stretch-out periods. There is a contingent that would have you believe that everything good has already been invented. Another contingent insists that virtually everyone who was going to buy a personal computer already has. Both are wrong.

The upcoming COMDEX this November looks to be the most interesting computer show in the past year and a half. On the software side, databases have gotten remarkably fast and remarkably smart. Old and new entrants alike will be sporting query-by-example and natural-language interfaces. One manufacturer, Javelin, has come up with a new paradigm for business problem-solving. It makes Lotus's 1-2-3 look like a straitjacket.

New versions of popular languages will give programmers previously unheard-of speed and power. Read-write laser disks, a new version of MS-DOS, bank switching, and ever-faster PC AT compatibles all conspire to woo the business dollar.

Even if none of these products are instant best-sellers, they all do the same thing: put the pressure on businesses to upgrade, to get in step with the state of the art. Each new product stretches the rubber band a little tighter.

Ultimately, business moves, and it moves in a big way. Maybe the original avalanche of PCs into the business world was only a delayed reaction to the pressure put on those who didn't buy a Vdec, who

didn't buy a North Star, and who thought the Apple II was a fad and VisiCalc was a gimmick.

Even if that's true, let's give them credit for having seen the light. ■

## E-Z-DOS-IT

### Processing Power of 4 Computers For \$59.95!



With E-Z-DOS-IT™ Concurrent Processing, your PC, PC/XT, or PC/AT can process up to four programs simultaneously. For example, communicate in the background while you're working at the screen. Ideal for PCs with 256K or 320K of memory. And E-Z-DOS-IT is compatible with the most popular software on the market, and it only takes 8K of RAM!

To Order Call:

USA 1-800-228-9602

CA 1-800-423-5592

Ask for Operator #20

**HAMMER**

Redefining Your PC Productivity.  
Hammer Computer Systems, Inc.  
900 Larkspur Landing Circle, Suite 250  
Larkspur, CA 94939

No copy protect.

## SEND ME E-Z-DOS-IT

Name \_\_\_\_\_  
Company Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Circle payment method For DOS 2.0/2.1 @ 59.95 \_\_\_\_\_  
VISA MC BANK DRAFT CHECK For DOS 3.0/3.1 @ 79.95 \_\_\_\_\_  
Account # \_\_\_\_\_ Subtotal \_\_\_\_\_  
Expiration Date \_\_\_\_\_ California Residents add 6% \_\_\_\_\_  
Shipping @ \$6.00/copy \_\_\_\_\_  
Total \_\_\_\_\_  
Signature \_\_\_\_\_

(COD's and purchase orders will not be accepted; Allow up to 6 wks. for delivery) CP 20  
HAMMER COMPUTER SYSTEMS INC., 900 LARKSPUR LANDING CIRCLE, #250, LARKSPUR, CA 94939

CIRCLE 268 ON READER SERVICE CARD



# Letters to PC Magazine

## DATA Is What?

The utility programs in your Programming columns often contain lengthy DATA statements in their BASIC listings. I often wonder how you come up with the numbers that fill these lines. I've tried many times to create .COM files using DATA statements with numbers I make up off the top of my head, but the programs never seem to work! Are the numbers contained in the DATA statements arbitrary, or do they each have significance? If they are significant, why are lines 370 to 520 of BAC.COM ("End Big Blue's Backup Blues," PC Magazine, Volume 4 Number 17) packed with zeros?

Roy Cantu  
Dallas, Texas

John Dickinson replies:

All computer files, including programs, are nothing but a series of numbers. However, as you guessed, the numbers in a program have a special role—they are the instructions that tell the PC what to do. The numbers in the Programming column are generated through programming languages, such as BASIC, assembly, or C, that know which numbers are associated with each computer instruction. Zeros in a program usually represent reserved memory areas. Although you can enter a program using DATA statements, you must know what each number instructs the computer to do. A random string of numbers in DATA statements will probably be meaningless and may even cause damage.

## Lexical Omissions

We enjoyed reading John Dickinson's "Lexical Electronic Filing" (PC Magazine, Volume 4 Number 17), which was a careful and thorough comparison of ZyLAB's ZylINDEX and three other information retrieval programs.

There were, however, two minor errors. The article accurately describes ZylINDEX's use of Boolean search operators, but the comparison chart on page 144 incorrectly lists a "no" for this feature in ZylINDEX. There should be a "yes" under

ZylINDEX and a "no" under OCRS in the chart's listing of the "Boolean operators in search" feature. Also, the article mentions 4-1-1's wildcard search capability but does not mention that ZylINDEX also lets users include DOS wildcards in their search



terms.

ZylINDEX was also mentioned in PC Magazine's June 25 issue ("Preserving the Past on Disk," Volume 4 Number 13), but unfortunately the name of the product was incorrectly spelled as "XylINDEX." ZyLAB Corp. and ZylINDEX are not in any way related to XyQuest and its product, XyWrite.

Wendy S. Williams  
ZyLAB Corp.  
Chicago, Illinois

John Dickinson replies:

Sorry about the wildcard omission. Say, if I searched an ?Y\*, what do you suppose I'd come up with?

## A Novice's Plea

I have been using an IBM PC for about 2 years and have subscribed to your magazine for nearly that long. Despite the increase in my knowledge, I have found a larger and larger proportion of your articles to be beyond my comprehension. I like the reviews but usually cannot understand the rest of the magazine.

I would like to suggest that you devote at least a small part of each issue to introductory topics for the novice. Some suggested topics: What is a batch file? How do you write a simple AUTOEXEC file? How do you capture a file from modem to

disk? How do you set up and access directories and subdirectories?

These questions could be answered by a beginner's guide to DOS or to the PC, but they still exemplify the confusion of a user who bought the PC mainly for word processing but would like to learn more.

Louie Angular  
Middleton, Wisconsin

As Editor Bill Machrone is fond of saying, "Everybody's a beginner—far about 20 minutes." We aim the majority of PC Magazine's editorial content at business and professional users who are already proficient in one or more aspects of computer use. Since there will always be someone out there who needs to know how to write a batch file, the best place to learn is a book. Once you have the basic concepts down, we'll show you what to do.—Ed.

## dBASE Is dISSUE

In the September 3, 1985, Power User on dBASE II (PC Magazine, Volume 4 Number 18), a dBASE-DOS interface is described for dBASE II. It is worth mentioning that in dBASE III, this facility is available by typing an exclamation point (!) in front of commands to be handled by DOS. So, to execute another program from within dBASE III, you follow the dot prompt with ! <program name>. The path should be set to allow DOS to find the programs outside the subdirectory where dBASE III resides.

I agree with the editor's comments about using WardStar to edit dBASE programs. This procedure is especially important if graphics characters are included in the program files. Many word processors destroy the graphics characters, but ED-LIN and WardStar do not. dBASE III allows you to avoid the described procedure for getting from WardStar to dBASE II. The default editor that comes up on the dBASE III screen in response to MODIFY COMMAND can be set to the program of your choice. This is done by setting up a CONFIG.DB file containing the TEDIT = <program name> command. This is



**CALL TOLL FREE 1-800-382-2242**

# NORTHEAST

*Software*

88 Ryders Lane, Stratford, Connecticut 06497

**• WIDEST SELECTION • LOWEST PRICES • FINEST SERVICE**

88 Ryders Lane, Stratford, Connecticut 06497

**WIDEST SELECTION  
ES • FINEST SERVICE**

1. Check our low prices. Most of our prices are the lowest in this magazine. If we don't already have the lowest price, **WE WILL TRY TO MATCH AND BEAT ANY ADVERTISED PRICE.**
2. Top our unmatched selection and inventory of software/hardware for the IBM PC (and the Apple and Mac).
3. Let us help serve you better.
  - School and corporate purchase orders are welcomed. **CALL 1-800-874-1108.**
  - Special orders and rush orders. (If something you need is not listed or hard to find or if you need software/hardware in a hurry.) **CALL 1-800-874-1108.**
  - Order status. **CALL (203) 375-3860.**
  - Frequent Purchaser Program. Accumulate purchases and receive **ADDITIONAL** discounts. Ask our operators for details.
  - Software Rental Library. For 25% of our price, rent any program for two weeks. Apply your rental fee toward purchase if you choose.
  - Technical experts on duty.
  - Convenient hours. 7 days/week: **9A.M.-11P.M.**
  - Free Overnight Air Shipping. Purchase \$150 or more of software and at no additional charge we will ship your goods by air courier. Mention this to your operator as you place your order.
  - No additional charges for credit card orders.
  - Further discounts by mail. Just circle the items you want; cut out the ad; fill out the coupon below, and receive \$1 off each item!

**Y&A** Send coupon and list of items desired to:  
**DISCOUNT BY MAIL DEPARTMENT**  
**NORTHEASTERN**  
 88 Ryders Lane, Stratford, CT 06497

To be eligible for the \$1.00 per item discount you must:  
 1. Fill out all items. 2. Send in our ad with the items you desire dried.

Name

Address

(Include Company Name)

City  State  Zip

Phone No. at above address

Check form of payment

☐ Visa ☐ MasterCard ☐ C.O.D. ☐ Personal Check

☐ Certified Check ☐ Money Order

Card No.  Exp. Date

Call (203) 375-3860 to check on the status of your order.

©1984 PC

Personal and company checks allow 3 weeks to clear. The Tax Authority need not be a check, certified check, or money order. Shipping: \$25.00 (US only). C.O.D. add an additional \$2.00. Shipping: Worldwide (phone call 263-375-2804). Alaska, Hawaii, Canada, P.R., APO, and FPO \$5.00 minimum. Foreign orders - \$15.00 minimum and 15% of all orders over \$100. International & Worldwide (include zip code and explanation please.) Consistent materials add 7.5% when tax. We ship only for our stores. Please subject to change without notice. All returns must have a return authorization number. Call 263-375-2804 to obtain one before returning goods for replacement. Refunds available only on items we own. We do not accept returns on gift certificates. All sales are final.

## ACCESSORIES

AST	575.00	Super Lite w/4K4	.....
3190	499.00	The Cheapest	.....
SEI-IT	499.00	SCREEN WIRE	.....
Advertising Board 1296	390.00	Screen Wire 4K4	.....
160 Plus II	124.00	SMALL TRIPS	.....
Precision	275.00	J-Ram Based w/4K4	.....
Search	245.00	TALLGRASS	.....
Sun ProFit Pro 304K	340.00	Hard Drive Sub Systems	.....
SALE	286.00	TANDON	.....
COE INTERNATIONAL	225.00	.....	.....
70 MS 4K4 (complete package)	150.00	.....	.....
CMCTS		TEAC	.....
PC Product III	29.00	FD-504 16K4 3400 disk w/4K4	.....
Super Products F404	29.00	TECHMAN	.....
BCA	29.00	Capstan Board (204K)	.....
		Graphics Monitor Board	.....

## MODEMS

[illegible]

## EDUCATIONAL SOFTWARE

ONLINE TECHNOLOGIES	\$55.00	ATI	3D Builder Programs
Onyx Data Systems	150.00	Training Power Programs	IMAGERS
PARADIGM SYSTEMS	252.00	IMAGERS	Image Capture or Scan
Shish (w/BI)	150.00	Image Capture or Scan	IMBLE SOFTWARE
Intermedia Graphics Corp.	232.00	THE WORLD IS FULL OF WIN	
Real Display Corp.	170.00	CMS SOFTWARE	
Realtime Graphics	190.00	Shore's Bridge	
PURETEXT DATA		Introducing the SAT	
Perf Consulting Inc.	13.00	All programs	
PERISTE		CHANGING LIVES	
PC Multimedia Board	165.00	Learn to Relax Stress	
PHAROS		ADD-ON	
Expanded Graphics w/BI	182.00	Also Addition or Misc. Modules	
Expanded Graphics w/2048	217.00	Robbins Graphics Workbooks	
Expanded Graphics w/1648	245.00	Customization Services	
Real & Expansion Board	244.00	Memory Subsystems	
Real & Expansion Board	1200	Sealife 3000	
Real & Expansion Board	236.00		
RACORRE			
Real Time for PC & X	475.00		

<b>Andy Weiss</b>	28.00
<b>DAYTON AND ASSOCIATES</b>	
Accounting	34.00
Spread Sheets	34.00
Spill 'n' Word Attack	34.00
<b>DEBENHAME</b>	
Accounting	26.00
Computer Networks and Locations	26.00
Corporate Governance	26.00
Graphic Design	26.00
<b>DIGITAL RESEARCH</b>	
Dr. Lago	82.00
Graphic Design (15 Issues)	82.00
<b>EDWARDS</b>	
Algebra I, II, or III	21.00
Bookkeeping	21.00
Computer BASIC	21.00
Computer BASIC JOHNSON	21.00
Computer BASIC II	21.00
Computer BASIC III	21.00
<b>FOURMAN BROS.</b>	
Accounting	95.00
Management Edge	127.00
Math Problem	28.00
Navigation Edge	147.00
<b>GENERAL</b>	
<b>INDIVIDUAL SOFTWARE</b>	
Professor PDS	34.00
Professor PDS	34.00
Professor PDS	34.00
Tabular Set	34.00
Typing Instruction	34.00
<b>GOULD</b>	
Kodak Print	85.00
<b>LEARNING COME</b>	
Address Generator	12.00
End Values or Binary Images	12.00
Number Scramper or Number Hidden	12.00
Plan	45.00
Plan Building Blocks	45.00
Plan Files	45.00
<b>SCARBOROUGH</b>	
Accounting	28.00
Accounting, Finance, Tax	28.00
<b>SHAW-WALKER SCHUSTER</b>	
Typing Tutor II	23.00
<b>SHAW-WALKER</b>	
Accounting or Design	34.00
End Values or Binary Images	34.00
Number Scramper or Number Hidden	34.00

## GAMES

<b>BLUPOOP</b>		
Bonus	.....	\$1.00
Millennium	.....	\$1.00
Trojan	.....	\$1.00
<b>BRODERBUND</b>		
Ancient Art of War	.....	\$7.00
Lein Hammer	.....	\$7.00
<b>CBS SOFTWARE</b>		
Felony	.....	\$5.00
Murder by the Ocean	.....	\$5.00
<b>DAKSOFT</b>		
Brown Lee	.....	\$4.00
<b>HATDEN</b>		
Baby Girl	.....	\$6.00
Suspense III	.....	\$6.00

# THERE IS NO REASON

**Connecticut Orders Call (203) 375-3860**

# ASTERN ...SIMPLY THE BEST

**INFOCOM**

[illegible]

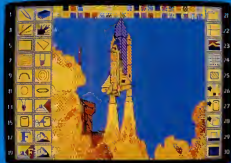
## TO SHOP ELSEWHERE!

# We did for Graphics what Borland did for Desk Utilities...

INCLUDES  
LOTUS®  
SCREEN  
CAPTURE



1. Sketch
2. Stamp
3. Stamp
4. Rotate
5. Size
6. Rotate
7. Constrain
8. Select
9. Fill
10. Fill
11. Color
12. Fill
13. Outline
14. Brush
15. Eraser



16. Cut and Paste
17. Fill
18. Fill
19. Fill
20. Fill
21. Fill
22. Fill
23. Fill
24. Fill
25. Fill
26. Fill
27. Fill
28. Fill
29. Fill
30. Fill

## We made it affordable...

# \$49.95

IBM PC, PCjr, XT, AT (and compatibles), 128K RAM, One Double Sided Disk Drive, Color Graphics Adapter, Graphics Monitor, Mouse or Tablet (optional); DOS 2.0 or higher

SPECTRUM HOLOBYTE, INC., 1050 Walnut, Suite 325, Boulder, CO 80302 (303) 443-0191. Check your local computer store or wherever software products are sold. Dealer inquiries call: (800) 621-8385 x262. Program by Migrat, Inc. (Written by Rick Minicucci and designed by Glenn Williams.) Suggested retail \$49.95. IBM is a registered trademark of International Business Machines Corporation. Borland is a registered trademark of Borland International, Inc.

TO ORDER CALL: (800) 621-8385 X262

Spectrum Holobyte



## LETTERS TO PC MAGAZINE

described in the dBASE III documentation Appendix B, "Specifications for dBASE III System Configuration Facility." I keep a second installation of WordStar in my dBASE subdirectory configured to come up in nondocument mode.

I really enjoy PC Magazine and appreciate the collection of readable and understandable information gathered under one cover. In searching for information about products, discussions with colleagues often end with referrals to past issues of PC Magazine. I do a lot of hardware and software evaluation for clients and find that your reviews give good ideas for carrying out a general evaluation.

Phyllis R. Kolms  
Adelphi, Maryland

David Obregón replies:

*You are certainly correct regarding dBASE III's extended DOS facility and the default editor-substitution function. These are both wonderful additions to dBASE's capabilities. The dBASE-DOS Interface described in Power User, however, not only gives dBASE II users this facility, it actually places a copy of the called-for program completely into memory, which dBASE III's method does not do. This difference alone can make the called-for program work faster than dBASE III's direct-access process. WordStar runs like lightning when called up into memory by the interface.*

*I must disagree with you, however, regarding WordStar's ability to handle extended graphics characters, even in its nondocument mode. I have found that while editing dBASE programs or screens with graphics, the WordStar-altered version of the command files have had the high bit stripped from the characters, rendering these characters into their lower-level ASCII counterparts. For editing graphics screens, an editor such as Xy-Write II-Plus is a better choice.*

### E-Mail of the Future

I liked Barbara Krasnoff's analysis of electronic-mail systems ("In Touch with the Outside World," PC Magazine, Volume 4 Number 18). My personal belief is that the true electronic-mail of the future will be the telex number connected to an electronic mailbox. After all, where would the

THE MOST POWERFUL, MOST  
COMPLETE dBASE PROGRAM  
DEVELOPMENT TOOL EVER!

# FLASH CODE™

Program Developer  
for **dBASE II & dBASE III**

INTRODUCTORY  
PRICE  
\$150.

## Actually "DRAW" your dBASE screens!

Take full advantage of all special characters, draw boxes and lines, use the color select menu, move pieces of the screen around, and more!

Specify variable names, file variables, data types, acceptable data ranges, pictures for edit checking, initial values, calculated fields, indexes, and more in a flash!

## FLASH Code writes your program in either dBASE II or dBASE III!

Use it as is, modify it, or merge it with your own code. You can even use our new FLASHUP module to instantly flash up even the most complicated screen designs. No more waiting for slow print statements to display your screens.



## POP-UP Windows

Create pop-up menus and pop-up help screens with our window editor. Use the FLASHUP module and have them pop up all over your dBASE applications.



## NO RISK DEMO OFFER! TRY IT—YOU'LL USE IT!

Here's a no-risk offer. Order now and you'll also get a full demo disk. Use the demo and the manual for 30 days. If you don't love it, return the package for a full refund!



THE  
SOFTWARE  
BOTTLING  
COMPANY  
OF NEW YORK

Credit card orders only call 24 hours a day, 1-800-824-7888, operator 268.  
For all other orders and inquiries call or write: The Software Bottling Company of New York, 6600 L.I. Expwy, Maspeth, NY 11378,  
(718) 458-3700. If we're shipping to a NYS address, please add 8 1/4% sales tax.

CIRCLE 171 ON READER SERVICE CARD

# INSTANT ANSWERS TO YOUR PC QUESTIONS

## 1-2-3 Macro Library

How to make the most effective use of 1-2-3 macros—for beginning and advanced users.

#9220

\$19.95



## PC DOS User's Guide

An explanation of all the basics needed to run PC DOS programs, complete with time-saving hints.

#9221

\$16.95

## Using Symphony

An excellent guide for first-time integrated software users and those upgrading from Lotus 1-2-3.

#9222

\$19.95



## Networking IBM PC's: A Practical Guide

A how-to discussion of selecting and installing the proper IBM PC network.

#9223

\$18.95

## Using MultiMate

An easy-to-read reference—complete with novel applications for customizing programs to your needs.

#9224

\$16.95



## dBase III Handbook

Complete instructions for designing and creating a database to fit your management needs.

#9225

\$17.95

Prices and Availability Subject to Change

*America finds it at*  
**Waldenbooks®**

Books • Audio • Video • Magazines • Software • Book Clubs • Special Services

Over 900 stores nationwide. For phone orders call 1-800-543-1300 and ask for Operator 390 (Alaska and Hawaii: 1-800-545-1000, Operator 390) Code: #SI421

Waldenbooks is a member of the American Express® Card

## LETTERS TO PC MAGAZINE

telephone companies be if there weren't a standard format for telephone numbers?

Along those lines, MCI Mail offers a free WUI telex number that enables a subscriber to receive

telex messages from other store-and-retrieve systems such as EasyLink, but you must ask for it. Otherwise, other e-mail services cannot transmit messages to MCI Mail. For reference's sake,

EasyLink charges its subscribers \$25 per month for the privilege of maintaining a telex number.

John A. Middleton  
Mokena, Illinois

## Speeding Across the Network

We at The Software Link were delighted that *PC Magazine* reviewed *LANLink* ("RS-232C LANs: A Basic Bargain," *PC Magazine*, Volume 4 Number 17).

Frank Derfler's major criticism seemed to be based on the mistaken idea that a CONFIG.SYS file can support only one device driver at a time. There is nothing to prevent multiple products from using device statements on the same satellite machine and no reason that *LANLink* would be incompatible with such products.

Although the article mentions that signals are sent "at least 50 feet at speeds over 9,600 baud," it does not say that *LANLink* is able to send data across the network at 115,000 baud.

Rod Roark  
The Software Link Inc.  
Atlanta, Georgia

*LANLink can indeed send files at 115 kilobits per second. Also, readers may have gotten the mistaken impression that only one device driver can be loaded at a time in the CONFIG.SYS file. You can load as many as your computer's memory will allow.—Ed.*

## E-Mail Query

I am in charge of the personal computer operations for a small consulting company with several offices across the country. All

[illegible]

# COPY II PC™


## • BACKS UP PROTECTED SOFTWARE

The backup insurance you need to protect your software investment, **COPY II PC** makes a floppy backup of most\* protected software quickly and easily.

## • RUNS PROTECTED SOFTWARE FROM YOUR HARD DISK

**COPY II PC** makes using your hard disk as convenient as it should be. No longer will you have to keep your floppy disk in drive A with some of the most popular business software - call for current list.

Minimum Requirements: IBM PC, XT, AT, 256K jr and some compatibles.  
One or two disk drives, 64K on most machines.

Call M-F 8-5:30 (W. Coast time) with your  : **503/244-5782**.  
Or send a check (add \$3 s/h, \$8 overseas) to



**\$39.95**

**CENTRAL POINT Software, Inc.**

9700 SW Capitol Hwy. #100  
Portland, OR 97219

We update Copy II PC regularly to handle new protections, you as a registered owner may update at any time for 1/2 price\* (30 update, just send original disk and \$20)

*This product is provided for the purpose of enabling you to make archival copies only*

CIRCLE 152 ON READER SERVICE CARD

## LETTERS TO PC MAGAZINE

of the offices use IBM PCs and IBM Display writers, all of which are equipped with Hayes Smartmodem 1200s. My company is interested in developing a bulletin board system for intracompany use. Are there any software packages available that help people set up these systems?

Jeffrey Kahn  
Setauket, New York

Craig Stark replies:

The bulletin board software we are currently using for PC Magazine's Interactive Reader Service is RBBS-PC, a product of the Capital PC User's Group. You can obtain a copy for \$8 (the cost of two disks, which include extensive documentation and source code) by contacting Thomas Mack, 10210 Oxfordshire Rd., Great Falls, VA 22066. This system has found widespread acceptance—it is used throughout West Virginia's school system and countless other bulletin boards.

Other bulletin board programs include BBS-PC, from Micro-Systems Software Inc., 4301-18 Oak Circle, Boca Raton, FL 33431, which is used by PC Tech Journal, and Fido-Net, from Fido Software, 2269 Market St., #118, San Francisco, CA 94114. The latter includes an electronic-mail module, although all BBS programs include message-handling facilities.

For a full discussion of available BBS and electronic-mail products, you might look back at PC Magazine's Corporate Communications cover stories featured in Volume 4 Number 18.

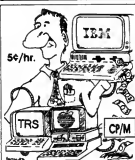
### Correction

Scholastic Software's "story processor" featured in New on the Market, Volume 4 Number 17, is called *Story Tree*, not *Story Line*.

### How to Write to PC Magazine

Do you have a comment, compliment, or criticism about something you've read in PC Magazine? A question you'd like to open up to other readers? Send it to Letters to PC Magazine, PC Magazine, One Park Avenue, New York, NY 10016. We are not able to answer letters personally.

All letters become the property of PC Magazine and may be subject to editing. We cannot print letters that do not include a name and an address.



## FILE TRANSFER

### + Conversion Utilities

Transfers: (no more retying)

- Visicalc, Multiplan
- Data Files, ASCII Files
- Word Processing Files
- Basic, Fortran, Cobol

**TRANSFER SERVICE:**  
Call for Information

TRS  
Apple  
CP/M  
IBM PC

To

IBM PC/XT  
Tandy 1000, 1200, 2000  
IBM AT  
(To/From) Tandy 2000 Disk Transporter

149.95  
149.95  
224.95  
129.95



■ PERSONAL  
■ COMPUTER  
■ PRODUCTS

Disks (Top Quality)	DS/DD	89¢ ea./100
Drives 360 KB	<del>266.00</del>	149.00
CMI 40 Meg.	<del>1150.00</del>	1014.00
128K Ram Set	<del>146.00</del>	105.00
Prototype Board & Extender Cards		120/ea.
High Capacity Disks	<del>540.10</del>	\$35/10

Phone Orders: MCHENCO@CHICK.OX  
**800 621-0854 Ext. 167**

3080 Olcott Dr. Ste. 130B, Santa Clara, CA 95051 (408) 988-0164

CIRCLE 302 ON READER SERVICE CARD



**NOW  
YOU CAN UPGRADE  
YOUR DOT MATRIX PRINTER  
To A Letter Quality PRINTER  
AND GET  
A 128K BUFFER AND  
MULTIPLE TYPE STYLES  
FREE**



**STYLEWriter**

By purchasing StyleWriter you are actually getting three different products for the price of one.

First, StyleWriter upgrades your dot matrix printer into a letter quality printer.

Second, StyleWriter is a buffer which can hold and print up to 65 pages of text allowing your computer to do what it was intended to—work, not wait.

Third, StyleWriter prints dozens of typestyles allowing you to create attractive and attention getting letters.

In addition, unique features such as highlighting, reverse printing and double underlining are standard.

StyleWriter works with *any* computer, *any* printer,\* and *any* software program, and the buffer is expandable to 64k or 128K.

StyleWriter prices start at \$169.00 with an 8K buffer and three typestyles included. Call (800) 222-9073 or (704) 525-4423 for information about the dealer nearest you.



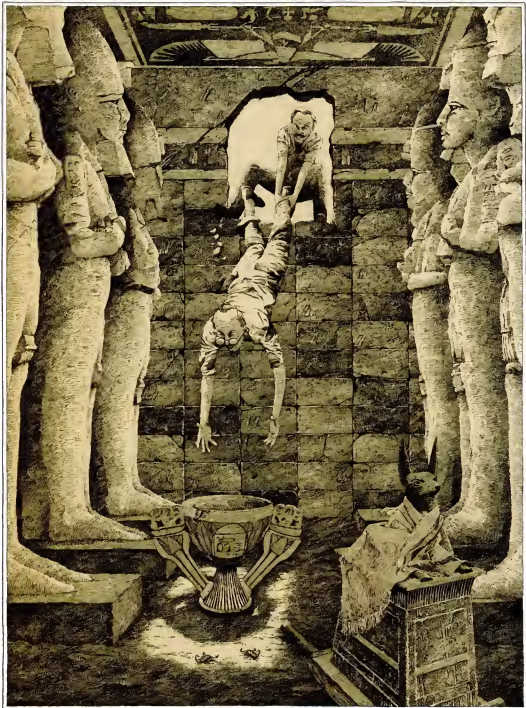
**Caroline Engineering Laboratories**

818 Tyvola Road/109 • Charlotte, NC 28210 • 704/525-4423 • 800/222-9073

\* Any all points addressable dot matrix printer.

The words "Letter Quality" are unretouched enlargements of actual StyleWriter print.

CIRCLE 370 ON READER SERVICE CARD



COMMON SENSE IN DATABASE MANAGEMENT  
NUMBER FOUR IN A SERIES.

# IT DOESN'T MATTER HOW GOOD IT IS IF YOU CAN'T GET YOUR HANDS ON IT

Buried deep in your company, there's an incredible source of wealth. People have spent thousands of hours creating it, one painstaking step at a time.

Then they store it in places where it'll never see the light of day. As you know, we're talking about data.

Because in most companies, the information you need to build a database is locked up in the corporate mainframes, minis and micros. Stored on hundreds of tapes and floppy disks. In a dozen different programs. And with most database software for PCs, the only way to put all this information together is to key it in stroke by stroke. Or write a different program for every data transfer. Unless you've got R:base™ 5000.

## ACCESSIBLE DATA

Using R:base 5000, it's possible to transfer data from any of the following popular programs and files. Instantly. Using dBASE III™ it's not nearly as easy.

Automatic Data Transfer From:	R:base 5000	dBASE III
Lotus 1-2-3®	Yes	No
pi! file®	Yes	No
dBASE II®	Yes	Yes
Multiplan® (Sylik)	Yes	No
Vincal® (Dif)	Yes	No
ASCII (delimited and fixed files)	Yes	No

## AUTOMATIC DATA TRANSFER. ONLY WITH FILEGATEWAY.™

With some DBMS software, you have to spend 90% of your time copy-

ing data that's already been keyed in somewhere else. But R:base 5000 has a FileGateway™ feature. Which lets you transfer information from all the programs listed in this chart. Automatically, without programming. Without even defining a file structure. All you do is follow a simple menu.

As a result, you can build a database with thousands of records in about the same time it takes to copy a disk.

And once you've got all that data in R:base 5000, you can really put it to good use. Because it lets you develop applications ten times faster; runs 60% to 150% faster; and gives you a much more sophisticated report writer than dBASE III.

## SEE FOR YOURSELF:

1-800-547-4000.

If you believe in common sense as much as we do, you'll want to try it out and see for yourself. So for only \$9.95 (plus shipping) we'll send you a mini-version of the product that lets you build real applications.

Just call 1-800-547-4000 and ask for Dept. 827. From Oregon, or outside the U.S., call 1-503-684-3000, Dept. 827. We'll send your copy right out. If you'd like to see R:base 5000 today, head straight for a leading software store or computer dealer.

And see what it's like to get your hands on a little satisfaction for a change.



## R:BASE 5000 FROM MICRORIM

IT ALL COMES DOWN TO COMMON SENSE.

RUNTIME VERSION  
NOW AVAILABLE.

## THE CMO ADVANTAGE

- ✓ THE BEST PRICES!
- ✓ Next day shipping on all in stock items.
- ✓ Free easy access order inquiry.
- ✓ Orders from outside Pennsylvania and Nevada save state sales tax.
- ✓ Free technical support with our factory trained technical staff.
- ✓ There is no limit and no deposit on C.O.D. orders.
- ✓ There's no extra charge for using your credit card. Your card is not charged until we ship.
- ✓ No waiting period for cashiers checks.
- ✓ We accept purchase orders from qualified corporations. Subject to approval.
- ✓ Educational discounts available to qualified institutions.
- ✓ FREE CATALOG MEMBERSHIP

## ORDER LINE

1-800-233-8950

In PA 1-800-242-4215

CUSTOMER SERVICE

&amp; TECH SUPPORT

1-717-327-1450

Dept. B110

## MAILING ADDRESS

Computer Mail Order

Dept. B110

477 East Third Street

Williamsport, PA 17701



MEMBER DIRECT MARKETING ASSOCIATION

## CREDIT CARDS



## SHIPPING

Add 3%, minimum \$5.00 shipping and handling on all orders. Larger shipments may require additional charges.

All items subject to availability and price change.

Returned shipments may be subject to a restocking fee.

## CANADIAN ORDERS

1-800-268-3974

Ontario/Quebec

1-800-268-4559

Other Provinces

1-416-828-0866

In Toronto

TELEX: 06-218960

2505 Dunwin Drive,

Mississauga, Ontario

Canada L5L1T1

All prices shown are for U.S.A. orders.

Call The Canadian Office for Canadian prices.

## DRIVES

## HARD

## ALLOY

PC Stor	CALL
PC Disc	CALL
PC QIC-Stor	CALL
PC Back-Up	CALL

## IDE

5 meg Removable Internal	\$1399.00
10 meg Fixed Internal	\$1249.00
15 meg 5 Removable/10 Fixed	\$2149.00
25 meg 5 Removable/20 Fixed	\$2499.00

## I-MEGA

15 meg Bernoulli Box	\$1999.00
20 meg Bernoulli Box	\$2599.00

## TELETYPE TECHNOLOGIES

12, 25, 35, 50, 60 meg (PC)	from \$1499.00
-----------------------------	----------------

## FLOPPY

## Tandon

320K 5 1/4"	\$119.00
-------------	----------

## TEAC

320K 5 1/4"	\$109.00
-------------	----------

## MODEMS

## VICOR

Volkemodem 300/1200	\$189.99
Mark XII (1200 Baud)	\$259.00
Signatime Express	\$299.00
Lightning 2400 Baud	\$399.00

## Hayes

Smartmodem 300	\$139.00
Smartmodem 1200	\$369.00
Smartmodem 1200B	\$359.00
Smartmodem 2400	SEE SPECIAL
Smart Com II	\$69.99
Chronograph	\$199.00
Transit 1000	\$309.00

## AST

Reach 1200 Baud Half Card	\$399.00
---------------------------	----------

## Novation

J-Cal	\$99.99
Smart Cal Plus	\$319.00
Novation 2400	CALL

## QUADRAM

Quadmodem II	
300/1200	\$339.00
300/1200/2400	\$499.00

## INTERFACES

## PARAGON

Microbuffer	from \$199.00
-------------	---------------

## QUADRAM

Microtizer	from \$139.00
Elazar (Epson)	from \$79.99

## DIGITAL DEVICES

Printer Buffer 16K	\$74.99
--------------------	---------

## GRAPHICS

## Kodak

Kodak Pad w/Micro Printer	\$69.99
---------------------------	---------

## MICROPHONICS

Pronounce	
Speech Input System	\$499.00

## Polaroid

Palette	\$1299.00
---------	-----------

## MONITORS

## AMDEK

300 Green	\$129.00
300 Amber	\$139.00
310 Amber IBM Plug	\$169.00
Color 300 Composite	\$179.00
Color 500 Composite/RGB	\$369.00
Color 600 Hi-Res (840x240)	\$399.00
Color 700 Hi-Res (720x240)	\$499.00
Color 710 Long Phosphor	\$579.00
Color 720 IBM Enhanced	\$579.00

## CAG

12" Amber/Green TTL... (ea.)	\$119.00
12" Amber/Green Comp.	\$99.99

## NEC

JB 1260 Green	\$59.99
JB 1201 G/1205A... (ea.)	\$99.99
JB 1270	\$139.00
JB 1275	\$149.00
JB 1280 G TTL/1285 A TTL (ea.)	\$149.00
JC 1480 Color	\$299.00
JC 1410 RGB	\$699.00

## PRINCETON

MAX-12E Amber	\$169.00
MAX-9" RGB	\$469.00
HX-9E Enhanced	\$519.00
HX-12" RGB	\$469.00
HX-12E Enhanced	\$559.00
SR-12 Hi-Res	\$599.00
SR-12E Enhanced	\$649.00

## TAXAN

121 Green TTL	\$139.00
122 Amber TTL	\$149.00
420 Hi-Res RGB (IBM)	\$429.00
440 Ultra Hi-Res RGB	\$559.00

## QUADRAM

6400 Quadchrome	\$479.00
6410 Quadchrome II	\$499.00
6430 Quadchrome	\$179.00
6500 Quad Screen	\$1499.00

## ZENITH

ZVM 1220/1230	\$99.99
ZVM 1240 IBM Amber	\$149.00
ZVM 131 Color	\$249.00
ZVM 133 RGB/Color	\$429.00
ZVM 135 RGB/Color	\$459.00
ZVM 136 RGB/Color	\$599.00

## DISKETTES

## maxell.

3 1/4" SS/SD	\$39.99
3 1/4" DS/SD	\$54.99
5 1/4" MD-1 w/Hardware	\$16.99
5 1/4" MD-2 w/Hardware	\$23.99
5 1/4" MD-2 HD for AT	\$44.99

## Verbatim.

5 1/4" SS/SD	\$21.99
5 1/4" DS/SD	\$29.99
Disk Analyzer	\$24.99

## Dennison

Elephant 3 1/4" SS/SD	\$29.99
Elephant 5 1/4" SS/SD	\$13.99
Elephant 5 1/4" SS/SD	\$15.99
Elephant 5 1/4" DS/SD	\$16.99
Elephant Premium DS/SD	\$23.99

## IBM

5 1/4" DS/SD Floppy Disks (Box of 10)	\$25.99
---------------------------------------	---------

## DISK HOLDERS

## INNOVATIVE CONCEPTS

Flip-n-File 10	\$3.99
Flip-n-File 50	\$17.99
Flip-n-File 50 w/lock	\$24.99
Flip-n-File (400/600 ROM)	\$11.99

## AMARAY

50 Disk Tub 5 1/4"	\$9.99
30 Disk Tub 3 1/4"	\$6.99

## PRINTERS

## Canon

A40	CALL
-----	------

LBP-5A1 Laser	CALL
---------------	------

## CITIZEN

MSP-10 (80 col.)	\$279.00
MSP-15 (132 col.)	\$389.00
MSP-20 (80 col.)	\$349.00
MSP-25 (132 col.)	\$509.00

## C.MOH

Printer 7500	\$215.00
Printer 8510P	\$299.00
Printer 8510 NLQ	\$329.00
Printer 1550	\$449.00
Starwriter 10-30	\$459.00

## corona

Lazer LP-300	\$279.00
--------------	----------

## DIABLO

D25 Daisywheel	\$545.00
630-109 Daisywheel	\$1749.00
D60F Daisywheel	CALL

## daisywriter

2000	\$749.00
------	----------

## EPSON

RX-100, LX-60	CALL
FX-85, FX-105	CALL
LQ 1500, LX30 Color	CALL
HomeWriter 10	CALL
NEW! LX-90, SQ-2000, DX-10, DX-20, HS-80	CALL

## JUKI

6000 Letter Quality	CALL
1100 Letter Quality	CALL
6300 Letter Quality	CALL

## NEC

8027 Transportable	\$299.00
2000 Series	\$699.00
3000 Series	\$1099.00
6000 Series	\$1499.00
ELF 360	\$449.00
Printer 560	\$999.00

## OKIDATA

82, 93, 182, 192, 193, 84	CALL
2410, Okimate 20	CALL

## OLYMPIA

Needlepoint Dot Matrix	\$299.00
Compact R0	\$339.00
Compact RD	\$369.00

## Panasonic

KK1091	\$256.00
KK1092	\$369.00
KK1093	\$479.00

## QUADRAM

Quadjet	\$399.00
Quadlaser	CALL

## SILVER-REED

500 Letter Quality	\$279.00
550 Letter Quality	\$419.00
770 Letter Quality	\$759.00

## star

SB/SD/SGSR	CALL
Typesetter Letter Quality	CALL

## Texas Instruments

T650	\$509.00
T655	\$799.00
T665	\$1049.00

## TOSHIBA

1340 (80 Column)	\$569.00
P351 (132 Column)	\$1149.00



**Smartmodem 2400**  
Baud Modem  
**\$589.00**

**AST**

**Six Pack Plus**  
64K  
**\$219.00**



**MicroPro**

**WordStar Pro Pack Plus**  
**\$289.00**

(While Supplies Last!)

### SOFTWARE FOR IBM

<b>Electronic Desk</b>	<b>ALPHA</b>	<b>IBM</b>
Electronic Desk	\$199.00	R Base 4000.....\$249.00
ASHTON TATE		R Base 5000.....\$399.00
Framework	\$399.00	Clout 2.0.....\$129.00
BASE II	\$299.00	
BASE II	\$399.00	
Friday	\$169.00	
<b>BORLAND</b>		<b>MICROSOFT</b>
Turbo Pascal	\$39.99	Flight Simulator.....\$39.99
Sidekick	\$39.99	MultiPlan.....\$129.00
		Microsoft Word.....\$29.00
		Microsoft Project.....\$59.00
		Microsoft Chart.....\$199.00
		Microsoft Mouse.....\$129.00
<b>CENTRAL POINT</b>		<b>MICROSILE</b>
PC Copy II	\$29.99	Crosslink.....\$69.99
<b>Continental Software</b>		<b>MultiMate</b>
Home Accountant Plus	\$49.99	MultiMate.....\$249.00
1st Class Mail	\$79.99	
<b>DECISION RESOURCES</b>		<b>PeachPack (GUI/AR)</b> .....\$199.00
Chemmaster	\$229.00	
Signmaster	\$199.00	
Diagram Master	\$219.00	
<b>ELECTRONIC ARTS</b>		<b>IBM</b>
Get Organized	\$59.99	Access.....\$79.99
Archon	\$24.99	File/Write/Graph.....\$79.99
<b>EMERITRONICS RESEARCH</b>		Report.....\$74.99
Emergraphics/Plater	\$269.00	Plan.....\$79.99
<b>FUNK SOFTWARE</b>		<b>Professional Software</b>
Sideways	\$39.99	PC Plus/The Boss.....\$249.00
<b>Harvard Software Inc.</b>		<b>RoseSoft</b>
Harvard Project Manager	\$209.00	Pro Key.....\$69.99
Total Project Manager	\$269.00	
<b>Hayes</b>		<b>Software Arts</b>
Please (Data Base)	\$199.00	TK/Sorter (IBM).....\$249.00
<b>Amec</b>		<b>SOFTWARE GROUP</b>
PC Paintbrush	\$69.99	Enable.....\$339.00
PC MousePaint	\$139.00	
<b>TYPOCOM</b>		<b>SORCUM/IUS</b>
Witness	\$29.99	<b>MICRO SOFTWARE</b>
Enchanters	\$29.99	Accounting
Planetary	\$29.99	AP/AR/IN/OUT (e.s.).....\$299.00
Hoch Mixer	\$29.99	Supercalc II.....\$199.00
Cut Throat	\$29.99	EasyWriter 4 System.....\$199.00
Zork 1, 2, 3	\$27.99	Super Project.....\$199.00
Indel	\$29.99	
<b>LIFETIME</b>		<b>SPI</b>
Volunteer Deluxe	\$159.00	Open Access.....\$379.00
<b>LIVING VIDEO TEXT</b>		<b>SSI Software</b>
Think Tank	\$109.00	Word Perfect.....\$219.00
<b>Lotus</b>		<b>SYNOPSIS</b>
Symphony	\$429.00	File Manager (IBM).....\$39.99
1-2-3	\$309.00	
<b>meca</b>		<b>TLS ACCOUNTING</b>
Manage Your Money	\$109.00	Solomon II GL, P, AR, AP.....\$519.00
<b>MicroPro</b>		<b>THOUGHTWARE</b>
WordStar 2000	\$249.00	Trigger.....\$269.00
WordStar 2000+	\$299.00	Sell, Sell, Sell.....\$299.00
		Application.....\$179.00
		<b>WARRIOR SOFTWARE INC.</b>
		The Desk Organizer (IBM).....\$119.00

### IBM PC

#### IBM PC-II

#### IBM-XT

#### IBM-AT

#### SYSTEMS

Configured to your specifications.

Call for the price and availability of your system requirements.



<b>Setari (7300)</b>	CALL	<b>KAYPRO</b>	CALL
6300	CALL	KP-2000 Portable	CALL
<b>COMPAQ</b>	CALL	<b>corona</b>	CALL
Portables	CALL	PPC400 Dual Portable	\$1299.00
Desk Pros.	CALL	PPC210 10 meg Portable	\$1999.00
AT205	CALL	PC40022 Dual Desktop	\$1399.00
<b>ITT X-TRA</b>	CALL	PC400-HD2 10 meg	\$1999.00
256K, 2 Drive System	CALL	<b>IBM</b>	CALL
256K, 10 meg Hard Drive System	CALL	PC-158-21 Single Desktop	CALL
XPS, 20 meg	CALL	PC-158-52 Dual Desktop	CALL
<b>SANYO</b>	CALL	PC-151-21 Single Portable	CALL
MBC 550-2 Single Drive	\$699.00	PC-161-52 Dual Portable	CALL
MBC 555-2 Dual Drive	\$999.00	2-200 (AT)	CALL
MBC 511 10 meg	\$1799.00	171 (Portable)	CALL
675 Portable	CALL	138 (Transportable)	CALL
660 Desktop	CALL	148 (Desk Top)	CALL

### ACCESSORIES

<b>MEMORY CHIPS</b>	<b>KENNINGTON</b>	
4164 RAM Chips.....(ea.) \$1.79	Master Piece.....\$69.99	
128 RAM Chips.....(ea.) \$6.99	Master Piece Plus.....\$119.00	
256 RAM Chips.....(ea.) \$5.99		
<b>KEYBOARDS</b>	<b>CURTIS</b>	
key tronic	Side Mount SS-1.....\$19.99	
KB5150/KB5151/KB5151J.....CALL	Diamond SP-1.....\$39.99	
KB5152B/KB5153/KB5148J.....CALL	Emerald SP-2.....\$44.99	
	Sapphire SPF-1.....\$59.99	
	Ruby BPF-2.....\$69.99	

### MULTIFUNCTION CARDS

<b>AST</b>	<b>PARADISE</b>	
Six Pack Plus.....SEE SPECIAL	Modular Graphics Card.....\$279.00	
Mega Plus II.....\$269.00	Multi Display Card.....\$229.00	
IO Plus II.....\$139.00	Five Pack C, S.....\$159.00	
Adventure - AT.....\$399.00		
Graph Pak.....\$249.00	<b>SIGNAL</b>	
MonoGraph Plus.....\$399.00	Color 400.....\$579.00	
Preview Mono.....\$299.00		
PC Net Cards.....\$379.00	<b>TEGMAR</b>	
525/111 On-line.....\$799.00	Captain - 64.....\$199.00	
525/112 Remots.....\$679.00	Captain Jr. 128K.....\$279.00	
3780.....\$639.00	Graphics Master.....\$469.00	
BSC.....\$499.00		
<b>dca</b>	<b>QUADRAM</b>	
IRMA 3270.....\$679.00	Quadport-AT.....\$119.00	
IRMA Print.....\$999.00	QuadmagMT (128K).....\$349.00	
<b>EVEREX</b>	The Gold Quadboard.....\$449.00	
Edge Card.....\$299.00	The Silver Quadboard.....\$239.00	
Color Card (Graphics Edge).....\$299.00	Expanded Quadboard.....\$219.00	
Magic Card II.....\$179.00	Quad 512+.....\$229.00	
<b>HERCULES</b>	Liberty.....\$309.00	
Graphics.....\$299.00	Quad Sprint.....\$499.00	
Color.....\$159.00	QuadLink.....\$399.00	
<b>MYLEX</b>	QuadColor.....\$199.00	
The Chairman.....\$479.00	Quadtr Expansion Chassis.....\$469.00	
<b>PERSYST</b>	Expansion Chassis Master.....\$199.00	
Bob Board.....\$399.00	Chronograph.....\$79.99	
	Parallel Interface Board.....\$64.99	

**1-800-233-8950**

CIRCLE 19 ON READER SERVICE CARD

COMPUTER MAIL ORDER

# SOME FLOPPY DISKS WILL GIVE YOU A BYTE YOU'LL NEVER FORGET.



You'll find them lurking in stores wherever floppy disks are sold. Those evil denizens of computer drives that are eagerly waiting to devour your valuable information, bit by bit. What they can do to you and your business is too painful to print.

At TDK, we grimace at that thought. Which is why we took great pains to develop an absolutely flawless disk. One that is made with such technical superiority that it meets or exceeds the most rigid industry standards.

Whether you choose our 8-inch, 5.25-inch standard, 5.25-inch High Density or 3.5-inch No-Risk Disks, you'll be assured of consistent error-free performance, through years of extended usage. And although you'll probably never need it, it's nice to know that all our disks are covered by a lifetime replacement warranty.

It's also nice to know that our disks share both the technology and dedication to quality that have made TDK the world's largest manufacturer of magnetic media—including our higher-performance audio and video recording tapes. The fact that millions of people rely on our products is a true testament to our 50 year heritage in the industry.

So, the next time you enter the cluttered jungle of floppy disks, don't pick up something hazardous to your company's health. Avoid a bad byte. Use the TDK No-Risk Disk.



# THE NO-RISK DISK. TDK®

CIRCLE 226 ON READER SERVICE CARD

# THE PROFESSIONAL'S CHOICE

**Lotus**  
1-2-3  
\$309

**Lotus**  
Symphony  
\$429

**dBase III**  
\$369

**FrameWork**  
\$369

**MultiMate**  
\$249

**Word**  
Perfect  
\$209

## Software

### Word Processing Editors

FANCY FOOT	\$139
FINAL WORD	\$199
MICROSOFT WORD	\$229
MULTIMATE	\$249
OFFICE WRITER/	
SPELLER	\$259
PPS: WHITE	\$ 95
SABINA WORD III	\$399
VOLKSWRITER	
DELUXE	\$159
WORDSTAR	\$229
SCIENTIFIC	\$279
THE WORD PLUS	
(OASIS)	\$195
WORD PERFECT	\$209
WORDSTAR	\$199
WORDSTAR 2000	\$229
WORDSTAR 2000+	\$259
WORDSTAR PRO	\$199
XYWRITE II+	

### Spreadsheets/Integrated Packages

ELECTRIC DESK	\$209
ENABLE	\$269
FRAMEWORK	\$289
JAZZ	\$299
LOTUS 1-2-3	\$399
MULTIPLAN	\$135
OPEN ACCESS	\$259
SABINA PLUS	\$379
SMART SYSTEM	\$559
SHEETSPREAD	
AUDITOR	\$109
SUPERCALC 3	\$179
SYMPHONY	\$429

### Accounting

BPI	\$319
GREAT PLAINS	\$479
SUBS/ACCOUNTING	\$279
ONE WRITE PLUS	\$179
OPEN SYSTEMS	\$299
PEACHTREE	\$299
REAL WORLD	\$339
STATE OF THE ART	\$389
STAR ACCOUNTING	
PARTNER II	\$249
STAR ACCOUNTING	
PARTNER II	\$249

### Desktop Environments

DESK ORGANIZER	\$ 79
CEM DESKTOP	\$ 49
SIDEKICK	\$ 40

### Database Systems

ALPHA DATA BASE	
MANAGER II	\$179
CUPPER	\$399
CLOUT V2.0	\$139
CONCORD III	\$299
CORNERSTONE	\$299
ORASE II	\$299
ORASE III	\$399
KNOWLEDGEMAN	\$299
PPS: FILE/PPS:	
REPORT	\$119
POWERBASE	\$139
QUICKCODE III	\$189
QUICKREPORT	\$169
R BASE 4000	\$249
R BASE 5000	\$329
REFLEX	\$329
REVELATION	\$329

### Languages/Utilities

CONCURRENT DOS	\$199
CM C COMPILER	\$229
DIGITAL RESEARCH	
C COMPILER	\$219
DR FORTRAN 77	\$219
LATTICE C COMPILER	
MICROSOFT C	\$249
COMPLER	\$249
MS BASIC COMPILER	\$249
MS FORTRAN	\$239
HORTON UTILITIES	\$ 89
TURBO PASCAL	\$ 58
XENIX	\$ 58

### Project Management

HARVARD PROJECT	
MANAGER	\$209
HARVARD TOTAL	
PROJECT MANAGER	\$359
MICROSOFT	
PROJECT	\$159
PERTMASTER	\$249
SCITOR PROJECT	\$249
1000 W/GRAPHICS	\$251
SUPERPROJECT	\$319
TIME LINE	\$249

### Communications/Productivity Tools

CROSS-TALK	\$105
PROKEY	\$ 83
RELAY	\$ 99
REMOTE	\$119
SMART-COM II	\$119
SUPERKEY	\$ 55

### Graphics/Statistics

ARIST	\$279
AUTOCAD	\$249
BPS BUSINESS	\$249
GRAPHICS	\$229
CHARTMASTER	\$229
CHARTSTAR	\$189
ENERGRAPHICS	\$199
EXECUCISION	\$259
GEM DRAW	\$ 89
GRAPHWRITER	\$259
COMBO	\$359
MS CHART	\$159
OVERHEAD	\$259
EXPRESS	\$199
PC DRAW	\$249
PC PAINTER/SH	\$ 99
PC PAINT	\$ 79
PPS: GRAPH	\$ 95
SIGNMASTER	\$165
STATGRAPHICS	\$299
STATPAK-NWA	\$329
STATPAC	\$349
WALOHICK	\$419
BYRTAT	\$219

### Professional Development

EXPERTEDGE	\$249
LIGHTYEAR	\$229
MANAGEMENT EDGE	\$159
SALES EDGE	\$159
THINK TANK	\$119

### Personal Finance

DOLLARS AND	
SENSE	\$119
HOWARD TAX	\$195
PREPARER 85	\$195
MANAGING YOUR	
MONEY	\$119

## Hardware\*

### Accessories

CURTIS SURGE	
PROTECTORS	\$249
DATASHIELD BACKUP	
POWER	\$249
OLYMPIAN A/B SWITCH	
MICROBUZZER I/II	\$249
(B&K)	
MICROFAZER I/II	
(B&K)	\$219
256K RAM SET	\$ 49
8087 MATH CHIP	\$125

### Multi-Function Boards

AST ADVANTAGE	\$399
AST 8 PAK PLUS (84K)	\$259
AST 8 PAK PLUS (24K)	\$299
ORCHID BLOSSOM	
(386)	\$299
ORCHID BLOSSOM	
(384K)	\$299
ORCHID PC TURBO	\$899
PERIST TIME SPECTRUM	
(386)	\$209
PERIST TIME SPECTRUM	
(384K)	\$209
QUADBOARD (386)	\$229
QUADBOARD (384K)	\$229
TECMAR CAPTAIN	
(386)	\$199
TECMAR CAPTAIN	
(384K)	\$199
TECMAR JR CAPTAIN	
(386)	\$329
TECMAR JR WAVE (384K)	\$249
TECMAR MAESTRO	\$429
TECMAR WAVE (384K)	\$249

### Display Boards

EVEREX GRAPHICS	
EDGE	\$329
HERCULES GRAPHICS	
CARD	\$299
HERCULES COLOR	\$159
PARADISE MODULAR	
GRAPHICS	\$375
PARADISE	
MULTIDISPLAY CARO	\$295
PERIST BOB	\$429
PRINCETON SCAN	\$159
DOUGLAS	\$229
SIGMA COLOR 400	\$229
STB CHAUFFER	\$299
STB GRAPHICS	\$300
PLUS II	\$400
TECMAR GRAPHICS	
MASTER	\$249
TSENG ULTRA PAK	\$399
TSENG ULTRA PAK-S	\$399

### Emulation Boards

AST	
CBT 3278/9 Plus	\$999
IRMA	\$799
IRMA/HE	\$799
IRMA/PRINT	\$799

### Networks

AST PC NET	
CORVUS NET	\$249
ORCHID PC NET	\$249
3 COM	\$249

### Displays

ACRON 215A	\$499
PRINCETON HX-12	\$499
PRINCETON MAX-12C	\$169
PRINCETON SR-12	\$169
PRINCETON HX-12E	\$249
PRINCETON HX-12E	\$249
QUADRAM	
AMERCHROME	\$179
TAXAN 125 AMBER	\$1169
TAXAN 420/440	\$399/599
ZENTH 124 AMBER	\$145
ZENTH 135 COLOR	\$249

### Modems

AST REACH 1200	\$389
HAYES 1200	\$349
HAYES 1200B	\$389
HAYES 2400	\$429
VENTEL 1200	
HALF CARD	\$349

### Mass Storage/Backup

ALLOY M235 TAPE (EXT)	\$895
CORE 5400 (AT)	\$2595
IONIGA HERHULL	
BOX	\$2595
IHWI 2104 15MB TAPE	
(EXT)	\$950
SYSGEN IMAGE	\$950
TALLOARIS T50025	\$2845
TECMAR GIC-604 TAPE	
(EXT)	\$1499
TECMAR GIC-604 TAPE	
(EXT)	\$1199

### Printers/Plotters

C. ITOH	
DIABLO	\$249
EPSON FX-400	\$499
EPSON FX-100	\$499
EPSON FX-1500	\$999
HP 7475A PLOTTER	\$419
JUNI 9100	\$419
NEC P3	\$799
NEC 3550	\$1125
OKIDATA	
PARASOLIC	\$249
QUIME SPRINT 1155	\$1549
TOSHIBA P2049	\$829
TOSHIBA P251	\$1279

### Input Devices

KEYTRONIC I551	\$179
KOALA	\$249
MICROSOFT MOUSE	\$139
PC MOUSE W PAINT	\$139
PC MOUSE W PAINT	\$139

\*CALL FOR SHIPPING COSTS

**Harvard**  
HTPM  
\$259

**Chart-Master**  
\$229

**Quadboard**  
384K  
\$269

**Tseng**  
Ultra Pak  
\$399

**Smartmodem**  
1200B  
\$365

**Smartmodem**  
2400  
\$639

## LOWEST PRICE GUARANTEE!!

We will match current nationally advertised prices on most products. Call and compare.

*free!*

Diskette Library Case with your order



# 1-800-221-1260

In New York State call (718) 438-6057

TERMS:  
Checks—allow 14 days to clear. Credit processing—add 3% COD orders—cash.  
M O or certified check—add \$3.00. Shipping and handling UPS surface—add \$3.00 per item (UPS Blue \$6.00 per item). NY State Residents—add applicable sales tax.  
All prices subject to change.



MON.-THURS. 9:00AM-8:00PM  
SAT. & FRI. 9:00AM-4:00PM

**Softline**  
Softline Corporation  
P.O. Box 729, Brooklyn, N.Y. 11230  
TELEX: 421047 ATLN UI





## The rush to Revelation<sup>®</sup> has just begun.

When ordinary database management software isn't enough, enlightened users are switching by leaps and bounds to Revelation, the complete database and applications environment.

That's because Revelation includes powerful tools to create applications in no time. Plus advanced features that help users get the most from their system day in and day out.

For software developers, there's a powerful applications generator that builds files, fields, menus and reports.

For corporate users, Network Revelation is already off and running on

both IBM's<sup>®</sup> PC Network and any hardware running Novell NetWare.<sup>™</sup>

For hard-core programmers, Revelation's R/BASIC procedural language combines the best of BASIC with the structure and logic of C.

And for everyone, there's an advanced query language and report writer that's fluent in everyday English and eager to learn new expressions.

The secret is incomparable technology: variable-length fields to conserve precious disk space; unlimited files, fields and records; data dictionaries that make it easy to change your

database when you change your mind; plus a high-speed compiler to accelerate program execution. And, of course, conversion utilities for dBase II<sup>®</sup> and Lotus 1-2-3<sup>™</sup> are included at no extra cost.

Revelation isn't for everyone. But if you're ready for a database management system you'll never outgrow, rush to your nearby dealer.

Ask for an unforgettable demonstration of Revelation's superior capabilities.

IBM is a registered trademark of International Business Machines. NetWare is a trademark of Novell, Inc. dBase II is a registered trademark of Ashton-Tate. 1-2-3 is a trademark of Lotus Development Corporation.

Cosmos, Inc., 19530 Pacific Highway S.

**COSMOS<sup>™</sup>**  
CIRCLE 218 ON READER SERVICE CARD

Seattle, WA 98188, (206) 824-9942

# The Trouble with EGA

Although there's no doubt that IBM's Enhanced Graphics Adapter strikes a blow for display-card unity, software developers are going to have to play catch-up to tap into the card's power.

**B**ob Wallace, the author of the cheap and popular *PC-Write* word processing program, put it to me this way: "There are too many display adapters." He's right. The situation is bad, and things are only getting worse.

I've already talked about the wonders of IBM's Enhanced Graphics Adapter (EGA), a display board that I've praised and damned in prior editions of this column.

In this and the next few columns, I'll tell you about some more technical wonders of the EGA so that you can understand what its capabilities are and how your programs can take advantage of them. I'll begin by putting the EGA in context and explain how it fits into the whole scheme of display adapters for the IBM PC family.

## Choice of Three

More than anything else, the EGA is an attempt to unify the PC family's display adapters. Before the EGA, you basically had three standard adapters to choose from, with only a very slight degree of compatibility and integration among them. The first two cards were the familiar IBM Monochrome Adapter and the IBM Color/Graphics Adapter. The third card was the Hercules Graphics Adapter. Together, these three boards provided what you needed for your PC, albeit in a disorganized way. The monochrome adapter was IBM's idea of a business executive's display: crisp, readable characters and nothing more. The color/graphics adapter was a mixed bag of color and graphics. You could have lots of color (16 choices) in text only, a little color (4 hues) and crude graphics,

or no color and good graphics. It was nobody's idea of heaven, but it was workable, and the variety of things this board could do was gratifying. The color/graphics adapter's biggest drawback was that no matter which of the several possi-



Peter Norton

ble display screens you hooked up to it, the character resolution was poor. In short, the color/graphics adapter was an eye-burner.

The Hercules adapter bridged the gap between IBM's monochrome and color/graphics adapters. The board provided the same high-quality text characters as IBM's monochrome adapter and added high-resolution graphics, offering better quality graphics than the best the color/graphics card could give you. To top it off, the Hercules card provided a reasonable upgrade choice for the majority of PC users. Most PCs had the monochrome adapter and monitor, and the Herc card used the same monitor—to switch to a Herc called for only a new

display card, not the purchase of a new monitor. The only problem with the Herc card—a problem that you'll shortly see is going to haunt you—was that it gave the PC family a widely accepted de facto standard for monochrome graphics. But the de facto standard didn't win IBM's favor. IBM does not like its customers to choose their own equipment. It's IBM's job to tell you what you're supposed to have.

## Unification Search

The situation, so far, gave you a reasonably good selection of display options for your PC, but still a few things were wrong. The first problem was that there were too many boards with too many video modes. You needed simplification and unification. The second problem was that technology had moved forward; PC display adapters were starting to look dated and obsolete. Another problem—in IBM's eyes, if not in yours—was that one of the standard boards wasn't Big Blue's. You can't have true religion if you allow heretics and outsiders to write some of the gospel.

IBM's solution to these three problems was the EGA board. There are still problems with that solution, as you'll see in a moment, but the most important thing to understand is that the EGA is a solution to all the fundamental problems that you had with display adapters for the PC family. First, the EGA is unified: This single display adapter successfully acts as a monochrome adapter, a color/graphics adapter, or a monochrome graphics adapter (equivalent to the Hercules card). It's a one-board, unified replacement for three separate products.

# YOU FORCED US TO MOVE!

...and We Love You For It!

## LOGICSOFT



Because of the tremendous response you've given to our **FREE OVERNIGHT DELIVERY** and **10 OFF** policies, our growth has been phenomenal! Even we did not project how rapidly we would expand. Quite honestly there were times when it seemed like the whole country was trying to place an order...at the same time!

We realize that some of you have had problems getting through (our phones simply could not handle the volume) and, yes, some have even gotten their shipments late (our shipping department has been on a 12 hour schedule). To those of you, **WE APOLOGIZE** for the inconvenience and would like to say **THANK YOU** for your patience.

A one million dollar investment has allowed us to solve these problems...we've just moved into our new World Headquarters, beated up our sales department, added a spanking new phone system and built a fully automated warehouse.

Oh, sorry, we almost forgot "Harold" (who's extremely fast, but very sensitive) our new 100 terminal computer system. He's designed to speed up order processing to get your shipments out the door...test. Sorry Harold.

### INTERNATIONAL ORDERS

#### EUROPE

Announcing Logicsoft Europe!

Our European friends may now order directly through our Amsterdam Distribution Center, which carries the latest factory fresh versions of the most sought after IBM PC software and hardware. Now you can receive your order fast and still take advantage of the incredible savings that only mail order can offer. Please call or telex to confirm pricing & policies. Telex: 10759 Logic NL.

Call 020-634864 or mail orders to:  
LOGICSOFT EUROPE BV  
PO 4460, 1006 AL  
AMSTERDAM, HOLLAND

#### CANADA

For our Canadian customers we've installed a special local number, 416-249-4440. Now you can get the big cost savings in mail-order for the cost of a local call. Or, if you wish, Telex 286905 Soft UR.

#### FAR EAST AND AUSTRALIA

Call 516-249-4440 and ask for our International Department. They're experts on export and you get to take advantage of our great mail order prices. Telex 286905 Soft UR. Please call or telex to confirm pricing & policies.

WE WILL BEAT  
ANY PRICE BY

**\$10**

See Our Card for Details

**FREE**

Overnight Delivery

See Our Card for Details

**EVERYTHING YOU ALWAYS  
WANTED TO KNOW ABOUT  
BEATING A PRICE BUT WERE  
AFRAID TO ASK...**

or How I Learned To Save Money  
Without Really Trying.

We know there are still a few of you who have shied away from ordering from us (you know who you are) perhaps thinking our \$10.00 off and **FREE** overnight policies were a "gimmick" or a "come-on" to pressure you into something.

We'd like to tell you how simple it really is. Just pick up the phone and dial 1-800-645-3491, then tell your sales agent you'd like to beat a price (don't be embarrassed; he's not, the name and date of the publication and who you want us to beat. No gimmick, no come-on, it's that easy.

## CONFUSED OVER ACCOUNTING SYSTEMS?



We don't blame you, that's why we invite you to give us a call. We've evaluated over 50 of them and just because you can save a lot of money buying mail order shouldn't mean you have to sacrifice service...We want to take the time to assist you before you buy. We realize that an accounting system can add up to a sizeable investment and helping you end up with the right package for your money is what doing business is all about.

### ACCOUNTING SYSTEMS

Information	Unlimited (IUS)	Open Systems	Great Plains	Peachtree Series 8	State of The Art	Realworld (MBS)	BPI
Accounts Payable	*299	*409	*499	*389	*479	*575	*395
Accounts Receivable	*299	*409	*499	*389	*479	*575	*395
Fixed Assets	---	*409	---	*389	---	---	---
General Ledger	*299	*409	*499	*389	*479	*575	*395
Inventory	*299	*409	*499	*389	*479	*575	*539
Job Costing	---	*409	*499	*389	---	---	*539
Material Management	---	*409	---	---	---	---	---
Order Entry/Processing	*299	*409	---	*389	*479	*575	---
Payroll	*365	*409	*499	*389	*479	*575	*395
Report Writer	---	*409	---	---	---	---	---
Sales Invoicing	---	---	---	*389	*479	---	---
Purchase Order Entry	---	409	---	---	---	---	---

TCS Client Ledger System

JUST A PARTIAL LISTING OF ACCOUNTING SYSTEMS - CALL TODAY!

CIRCLE 282 ON READER SERVICE CARD

# LOGICSOFT®

110 BI-Country Blvd., Farmingdale, N.Y. 11735

**1-800-645-3491**

In New York State...516-249-8440 • In Canada...416-283-2354

Customer Service 1-800-431-9037

**THE LOGICAL CHOICE**

A Member of the Logic Group



See following pages for Hardware, Hardware, Special Order Dept., Programmers Dept., PC Jr. Corner and our Computer Forms Division.

**LOGICSOFT INCREDIBLE  
NEW SERVICE BREAKTHROUGH**

# FREE OVERNIGHT DELIVERY!

On Orders Totalling  
over \$100... Shipped  
UPS FREE if  
Under \$100  
(Within Continental  
U.S.)

VIA...  **Purulator  
courier**



**PLUS...IF YOU CAN FIND A LOWER PRICE**  
**We'll Beat \$10**  
**It By...**

THAT'S RIGHT! OUR LOWEST PRICE GUARANTEE IS STILL EFFECTIVE!  
Tell us the advertiser and price of any software or hardware item on these pages currently advertised in any popular computer publication and we'll beat that price by \$10. This offer does not apply to items under \$100 or where the price is not lower than Logicsoft's. NO DEALER'S PLEASE!

## SOFTWARE for IBM PC

### WORD PROCESSING

Wordstar 2000	\$259
WORDSTAR 2000 PLUS	309
Wordstar Pro Pac	265
Wordstar Pro Plus	345
WORD PERFECT (New Release)	245
Microsoft Word	245
Spellbinder	Lowest Price
MULTIMATE	249
Volkswriter Deluxe	165
Peachtext 5000	199
Easywriter II/Speller/Mailer	195
Edix & Wordix	255
FINALWORD	225
Sigma III	325
Ky Write II Plus	255
Think Tank	125
pts: write	85
Wordplus PC with Boss	359

### DATA BASE MANAGEMENT

KNOWLEDGEMAN	\$259
Cornerstone	Lowest Price
Tim IV	189
R-Base 4000	265
R-Base 5000	399
DB Master	475
d Base II (New Release)	295
Comdor III	349

### DATA BASE MANAGEMENT (cont.)

d BASE II	\$365
CLIPPER II BASE II COMPLER	399
Data Base Manager II (alpha)	175
Infostar plus	159
Finday	169
pts: file & pts: report	165
REVELATION	745
Powerbase	255
Personal Pearl	229
Easyfiller	235
Superfile	159
GURU	Lowest Price

### INTEGRATED/SPREADSHEETS

LOTUS 1-2-3 (Which they last)	\$305
Enable	399
Smart Series	579
Ability	339
FRAMEWORK	355
Open Access	355
Electric Desk	229
SYMPHONY (Limited Quantity)	429
Supercalc 3	175
Multiglan	129
Tkt Solver	279
pts: plan	85

### FINANCIAL

DOLLARS AND SENSE	\$115
-------------------	-------

### FINANCIAL (cont.)

Financier II	\$115
MANAGING YOUR MONEY	119
Home Accountant Plus	99
Professional Tax Planner	319
Fixed Asset System (BEST)	439
Market Manager Plus (Dow Jones)	179
Market Analyzer (Dow Jones)	269

### GRAPHICS

CHARTMASTER	\$275
Signmaster	195
BPS Graphics	289
pts: graph	85
GRAPHWRITER	319
Graphwriter Combo Pak	485
Microsoft Chart	175
ENERGRAPHICS	259
Energraphics with plotter option	325
PC Draw	295
Gem Draw (Incl. Desk Top)	95
AUTOCAD	as low as 799

### PROJECT SCHEDULERS

MICROSOFT PROJECT	\$165
SuperProject (IUS)	245
HARVARD TOTAL PROJECT MGR.	285
Project Scheduler (Sictor)	245
Project Scheduler 5000 (Sictor)	279

## SOFTWARE UTILITIES for IBM PC

### WORD PROCESSING

FANCY FONT	\$139
Wordplus (Basiss)	115
pts: proof	99
Punctuation & Style	99
Spellix	59
Wordperfect Sorter	75

### DATA BASE

Quackdo II	\$159
d Graph III	175
d Util III	65
k Graph	175
k Paint	85
k Text	109

### DATA BASE (cont.)

Clout 2	\$145
Extended Report Writer	119
Sideways	45
GENERAL	
PROKEY 4.0	\$89
Norton Utilities (New Release)	65
SIDEKICK (unreleased)	65

### GENERAL

CROSS TALK XVI (New Release)	\$115
Smartcom II	109
Sideways	45
Copy II PC	39
DESK ORGANIZER	65
Spotlight	55

Prices & prices subject to change without notice.

Immediate Replacement on any Defective Product.

• NO SLIPSHARE for VISA • MasterCard • No Sales Tax on Orders Outside N.E. States • Purchase Orders  
Noted and Insurance (on orders add \$1) • Payment MasterCard VISA American Exp. C.O.D. Money Order or Check

National Sales  
Hot Line

**1-800-645-3491**

Customer Service 1-800-431-9037

New York State...516-249-8440

Canada...416-263-2354

Domestic/International Telex...286905 Soft UR

THE LOGICAL CHOICE

A Member of The Logic Group  
110 Bi-County Blvd., Farmingdale, N.Y. 11735



WE WILL BEAT  
ANY PRICE BY  
**\$10**

See Other Side for Details

## NEW! Expanded Special Order Dept.

We know there are many products that simply cannot be found through mail order. We've solved that problem...just ask for our **SPECIAL ORDER** department...We've got the suppliers...still at low mail order prices!

**FREE**  
Overnight Delivery  
See Other Side for Details

### PC JUNIOR CORNER

#### SOFTWARE

Lotus 1-2-3 (Whole they buy)	\$309
Wordstar	149
Electric Desk	189
<b>HARDWARE</b>	
Captain 128K (Tecmar)	339
PC Mouse (Mouse Systems)	129

#### HARDWARE (Cont.)

Keytronic 5151 Keyboard	\$179
Keytronic 5149 Num. Keypad	80
Jr. 128K Booster (Microsol)	145
Quadram Expansion Chassis	519
Quadram Exp. Memory	235
Quadram Jr.	219

NEW PRODUCTS ADDED DAILY...CALL!

### PROGRAMMERS DEPT.

#### Concurrent PC DOS (x-headers)

Pascal Mail + (PC DOS)	\$599
PL/1 - (OR)	349
Display Manager - (OR)	489
Access Manager - (OR)	359
<b>LATTICE C COMPILER</b>	269
C-Mod Smorgasbord	305
	119

#### Pascal Compiler (MS)

C Compiler (MS)	\$245
Microsoft Sort	305
Cobol Compiler (MS)	159
Business Basic (MS)	479
<b>FORTRAN COMPILER (MS)</b>	299
C86 C Compiler	229
(Computer Innovations)	345

## GENERAL HARDWARE

#### PRINTERS\*

DIABLO	
36**	\$1229
025**	619
630 API	1529
630 ECS**	1799
<b>EPSON</b>	
LQ1500	1199
Parallel Interface	799
JX-80	599
LX-80**	265
LX-80 Tractor/Feeder	389
RX 100	399
FX-80 Plus**	379
FX 185 (New)**	569
<b>OKI</b>	
6100	\$439
6300	799
<b>MANNESMANN TALLY</b>	
Sprint 80	\$279
160	579
180	849
<b>NEC</b>	
2030**	\$719
2050**	695
3530	1329
3550	1395
8850**	1949
Pwprinter P2**	675
Pwprinter P3**	895
<b>OKIDATA</b>	
182P	\$239
84 IBM	799
192 IBM	409
193P	569
2410P	2295
<b>DUME</b>	
Sprint 11/40**	\$1299
Sprint 11/55**	1595
Sprint 11/90**	2199
<b>SILVER REED</b>	
400	\$279
500	349
550	449
770	795
<b>TOSHIBA</b>	
P351 Tractor	\$165
P351	1375
1340	779
<b>CITIZEN</b>	
MSP10	\$315

#### PRINTERS (cont'd.)

MSP15	455
MSP20	450
MSP25	595

#### PRINTER/PLOTTERS\*

#### QUONSTON INSTRUMENT

QC Plotter	\$475
------------	-------

#### MONITORS\*

<b>AMDEK</b>	
Color 300	\$255
Color 500	389
Color 600	479
Color 710	579
12" Green 300G	135
12" Amber 300A	145
12" Amber 310A	169
<b>NEC</b>	
JB 1201	\$159
JB 1205	149
JC 1215	239
JC 1216	399
<b>PRINCETON GRAPHICS</b>	
RGB HX-12	\$489
RGB SR-12	599
Scan Double Board (for SR-12)	185
Ambi Max 12E	185
<b>QUADRAM</b>	
Quadchrome 12"	\$465
Quadscreen 12"	1595
Quadcolor II 14"	465
Amberchrome 12"	165
<b>TAXAN</b>	
100G	\$125
105A	135
121	149
122	149
210	259
420	409
440	699

#### MULTI-FUNCTION BOARDS (cont.)

<b>STB</b>	
Super Rio (64k)	\$329
Rio Plus II (64k)	259
Rio Grande	375
Chaufeur	Lowest Price
<b>TECMAR</b>	
Captain (64k)	\$199
<b>COMMUNICATIONS BOARDS</b>	
<b>AST</b>	
AST-5251-11	\$699
AST-SNA	\$699
AST-BSC	699
AST-3760	749

#### GRAPHICS BOARDS

<b>AST</b>	
Monograph plus	\$425
Preview	279
<b>EVEREX</b>	
Graphics Edge	\$379
<b>HERCULES</b>	
Graphics Card	\$325
Color Card	169
<b>MA SYSTEMS</b>	
Peacock Color Board	\$245
<b>PARADISE SYSTEMS</b>	
Multi-Display Card	\$215
Modular Graphics Card	289
Options A & B	Lowest Price
<b>QUADRAM</b>	
Quadcolor I	\$195
Quadcolor II	465
<b>SIGMA</b>	
Color 400	\$549
<b>STB</b>	
Graphics Plus II	\$315
<b>TECMAR</b>	
Graphics Master	\$459
<b>YSENG LABORATORIES</b>	
Ultra Pak	\$545

#### MODEMS

<b>HAYES</b>	
Smartmodem 300	\$205
Smartmodem 1200	445
Smartmodem 1200B	385
Smartmodem 2400	719
<b>NOVATION</b>	
Access 1-2-3	\$475
Smart-Gat Plus (int.)	635
Professional 2400	635
<b>PRENTICE</b>	
Popcom X100	\$379

#### MODEMS (cont.)

Popcom C100	\$355
<b>PRIME TIMEUS</b>	
Pro modem 1200	\$375
Pro-Modem 1200B	319
<b>QUADRAM</b>	
Asher	\$395
Quadmodem II	Lowest Price
<b>RACAL-VADIC</b>	
Maxwell 1200 PC	\$395
Maxwell 1200 V	439
2400 PC	635
<b>VEN-TEL</b>	
PC Modem Half Card	\$379
PC Modem 1200	399
1200 Plus	399

#### BACK-UP DEVICES

<b>ALLOY</b>	
PC Quick Tape (60Mb)	\$1719
<b>SYSGEN</b>	
Image I (10Mb)	\$835

#### MOUSE INPUT DEVICES

<b>MOUSE SYSTEMS</b>	
PC Mouse w/airbrush	\$139
<b>MICROSOFT</b>	
Microsoft Mouse (Serial)	\$149
Microsoft Mouse (Bus)	139

#### SURGE PROTECTORS

<b>KENSINGTON MICROWARE</b>	
Master Piece	\$115
<b>CURTIS</b>	
Diamond	\$39
Emerald	49
Sapphire	59
Ruby	69

#### KEYBOARDS

<b>KEYTRONIC</b>	
5150	\$159
5151 (Deluxe)	179
5152B	645

#### MEMORY CHIPS

64k (200ns)	\$35
256k (150ns)	69

#### DISKETTES

<b>LOGICTRAK 5 1/4" 100% GUARANTEED</b>	
Double side, double density, 10 per box	
20 + boxes	per disk \$2.35
10 1/9 boxes	per disk \$2.50
2-9 boxes	per disk \$2.99
1 box	per disk \$3.99

\*Due to weight restrictions, Printers and Monitors are shipped UPS...FREE

\*\*Parallel interface req...Ask sales agent

• MS. EUROCARD or VISA or MasterCard • No Sales Tax on orders shipped R.P. State • Purchase Items  
for handling and insurance (not orders add'l) • Payment: MasterCard, VISA, American Exp. C.D. Money Order or Check

National Sales  
Hot Line

**1-800-645-3491**

Customer Service 1-800-431-9037

New York State...516-249-8440

Canada...416-263-2354

Domes...International Telex...286905 Soft UR

THE LOGICAL CHOICE

A Member of The Logic Group  
110 Bi-County Blvd., Farmingdale, N.Y. 11735



## THE NORTON CHRONICLES

Second, the EGA leads you into new technology: It has some new, high-powered modes that will give you more color—a full 64 colors—and higher color resolution than you've ever had before. In addition, there are some interesting plugs in the back of the EGA that hint of powers that will be unveiled in the future. So, the EGA is clearly a leap forward beyond the bounds of the old technology. Finally, and much to my regret, the EGA is also a solution to the third problem I mentioned, because while the EGA has the same kind of features as the popular Hercules graphics adapter—namely, high-resolution monochrome graphics on a standard IBM monochrome display screen—it is not compatible with the Hercules card.

### Laboring over Hercules

The Herc card creates a graphics mode with 720 dots across and 348 down, while the EGA has 640 by 350, an incompatible format. If you think of non-IBM gear attached to an IBM computer as heresy, then the EGA's monochrome graphics mode is a solution to a problem. If you like to use Lotus's 1-2-3, then the EGA is a pain in the tush. Many of today's hottest programs (1-2-3, *Framework*, *Microsoft Word*, and so on) have long supported the Herc card, but anyone who wants monochrome graphics using the EGA has to wait for all that great software to be updated to support the EGA's new monochrome graphics standard.

While the EGA is a wonderful display adapter, there's trouble in paradise. For the rest of this series of columns on the EGA, I'm going to be singing its praises, which are many. But right now, I want to get the EGA's problems off my chest.

The biggest problem is the big investment out there in display screen hardware and host software that isn't compatible with the EGA's idea of monochrome graphics. Of course, that should change. All those programs have the EGA's monochrome graphics on the list of new features in new releases; eventually all these new releases will be ready, eventually most users will have the new versions, and you'll be in shape for the EGA. The problem is, you're already in shape for an EGA that's Hercules compatible.

There are other drawbacks with the EGA. One is price. It runs about \$525, or double the price of either of the two original adapters that it is replacing, and that price doesn't even include any of its spe-

cial graphics memory options. Now I'll grant you that the EGA is well priced compared with the Herc card: only about \$25 more for lots more features. But one of the problems that the EGA was sup-

**NEW!**  
It's Even Faster!

**Volkswriter<sup>®</sup> Deluxe 2.2**

Now supports:  
• IBM PC/XT + IBM ENHANCED GRAPHICS MODE  
• IBM PC-AT HIGH SPEED KEYBOARD  
• ENHANCED COMMUNICATIONS  
• ALL NEW DOCUMENTATION All popular printers including the HP LaserJet



### "Volkswriter Deluxe"... The Critics' Choice!

“Thirty word processing programs were reviewed ... no other program received a higher overall evaluation than Volkswriter Deluxe.”

*Software Digest Ratings Newsletter, January 1984*

“If WordStar™ set a standard ... Volkswriter Deluxe sets a new standard for transparency, simplicity, and speed. You can learn Volkswriter in under an hour ... because it does so many things exactly the way you think they should be done.”

“VOLKSWRITER DELUXE is the best buy in the IBM-PC™ writing tool arena.”

*Charles Spezzano, Whole Earth Software Review, January 15, 1984*

“Lifetree ... provides exceptionally helpful and competent assistance to registered owners, and the company's update policies are excellent.”

In sum, this is a unique word-processing program.

*John Lombardi, Reviewer, InfoWorld, April 16, 1984*

**We couldn't  
have said it  
better ourselves!**

*Suggested Retail price: Volkswriter Deluxe \$295 for the IBM-PC and PC compatibles.*

*“Simply amazing”*

TopView, IBM PC, PC-AT are trademarks of International Business Machines Corp. WordStar is a trademark of MicroPro. Volkswriter Deluxe and the Lifetree logo are trademarks of Lifetree Software Inc.

© 1984, 1985 Lifetree Software Inc.

**FREE AT! TRAINING DISK  
WITH PURCHASE OF  
Volkswriter  
Deluxe \$39.95  
ADDED VALUE**

**LIFETREE  
SOFTWARE INC.™**

411 Pacific Street  
Monterey, California 93940  
(408) 373-4716 / TWX 176786

CIRCLE 385 ON READER SERVICE CARD





## International Connections

With the industry's most popular data communications program, the world is at your command.

An import/export office in New Jersey can instantly check the London market for current dollar exchange rates ... send Hong Kong an updated production schedule ... print-out the week's sales results from the Dallas branch.

There's virtually no limit to how far you can reach with your microcomputer, ordinary telephone lines, and CROSSTALK.

Even if your own business and personal needs are closer to home, you'll appreciate CROSSTALK's compatibility with a wide user base ... smart terminal characteristics ... total modem control ... and the ability to capture data at a high speed for later off-line editing. CROSSTALK has extras you may not find in other programs: Data capture to memory buffer (and on-line display). Protocol error-checking file transfer. Modem/telephone hangup, and display of elapsed time of call. Command file power and flexibility. Remote takeover and operation. And much more.

There is a CROSSTALK version for almost every CP/M, CP/M-86, or IBM DOS based microcomputer system. See your dealer, or write for a brochure.



**MICROSTUF**®

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

CROSSTALK is a trademark of Microstuf, Inc., CP/M and CP/M-86 are trademarks of Digital Research, Inc., IBM is a trademark of International Business Machines, Inc.

**CIRCLE 326 ON READER SERVICE CARD**

**CROSSTALK**



## THE NORTON CHRONICLES

posed to solve was the proliferation of display adapters. At the price it sells for, it has to be a high-end alternative to the two original adapters, not a replacement for them. And if you'd like another problem added to the list, there's character sets. Some specialty software—such as the STSC's APL programming language—use special ROM-based character sets and, of course, those ROMs aren't compatible with the EGA.

### A Chore for Developers

As Bob Wallace said, there are too many display adapters, and that's starting to hurt. Collectively you and I and the other 2 million PC users rely on the Bob Wallaces to provide us with the best possible software for the PC. Bob wrote a nifty and cheap word processor, one that at the moment works only in character mode. He wants to add the benefits of graphics mode to *PC-Write*, allowing on-screen italics, small caps, superscript and subscript, and—wonder of wonders—on-screen proportional spacing, something that even mighty *Microsoft Word* doesn't have. But to add graphics, Bob needs to support all the main graphics options. If he covers only a few, what's the point? Even the minimum list of different graphics modes he would have to support reads fairly long: the color/graphics adapter in high-resolution, black-and-white mode; the Hercules monochrome graphics mode; the EGA monochrome graphics mode; and the EGA high-resolution, 16-color graphics mode. That's four, and there are still other modes to be considered as well. While there is a lot in common among graphics modes and programs don't have to start from scratch for each of these modes, there still is much work to be done to make each mode on each adapter work well with a program.

Is Bob Wallace going to develop a graphics version of *PC-Write*? Will the hundreds of software writers that you depend on go to the trouble of supporting all these adapters and display modes?

That's the big problem that the EGA and any other complex new display adapter creates. I don't really want to argue against progress in the evolution of PCs and their equipment, but the

progress in display adapters is working against your interests. It becomes harder for small software vendors to give you lots of programs that work on every PC.

Well, this discussion has put the won-

derful EGA in perspective and has shown you what a difficult situation it has created. Now we can go on and see what the powerful features of the EGA are. I'll begin in the next issue.



## A BETTER WAY TO... DRAW, POINT, SELECT & POSITION

For graphics, and menu selection — for direct interaction with your computer — nothing beats a light pen. It's fast. It's natural. And unlike a mouse, it won't fight with you for desk space.

Over 7500 FTG light pens are in use world-wide — they're the undisputed standard for the IBM PC.

Software is available for graphics, education, 3278 emulation, and much more. Plus, our MOUSETRAP™ is the link to most programs that can use a mouse. And, if you do any programming, you'll find it easy to add light pen support to your own creations.

For added versatility, check out our new PXL-350 HI-RES LIGHT PEN BOARD. It's fully supported by the DR. HALO II™ graphics program.

The pen is \$195. The board is \$149 with single-pixel and TopView™ interface software. We back both with a 30-day no-risk trial privilege and a two-year limited warranty.

Call today to try them, or for more information.



### FTG DATA SYSTEMS

FOOT OF THE GRAPHIC INNOVATIONS, INC.

(714) 995-3900  
(800) 962-3900  
(800) 972-3900 (Calif.)

10801 Dale, Suite M-2, P.O. Box 615, Stanton, CA 90680 Telex: 887840



**20MB FULL HEIGHT DRIVE FOR IBM AT**  
 • Access time is 2 k's faster than any other 1/2 height drive \$795



**10-45MB 1/4" STREAMING TAPE by WANGTEK**  
 • Software includes image backup/restore and file by file  
 Internal - \$865  
 External - \$965

**IBM**



**20MB STREAMING TAPE DRIVE by MEMTEC**  
 • Backup 10MB in under 4 minutes  
 • Software included \$725



**10/20 MB HARD DISK SUBSYSTEM by Microscience**

- Half height
- Low power consumption
- Controller, software, cables included.

10MB \$535  
 20MB \$660



**ALSO AVAILABLE**

- Mounting bracket for COMPAQ OS SKPRO and IBM AT
- Data cable
- Y or power cable



**300/1200 MODEM**

- 100% Hayes Smart Modem and Bell 103/212 compatible
- Also supports COM 3 and COM 4

Internal - \$325  
 External - \$325

**COMPAQ**



**EXPANSION CHASSIS**

- Various I/O slots/ models to choose
- Supports all IBM controllers and memory expansion. \$565



**10MB FLOPPY TAPE BACKUP**

- Uses regular floppy controller
- External unit also available.

Internal - \$525  
 Interdyne - \$689



**COLOR/MONO GRAPHIC DISPLAY CARD**

- 720 x 350 resolution in monochrome
- 640 x 200 resolution in color

Color/Mono - \$250  
 Hercules Compatible Mono - \$255



**MEMORY EXPANSION CARD**

- Serial, parallel game ports and clock/calendar
- Expansion capability to 384K
- Includes 64K memory Free \$199



**HALF-HEIGHT FLOPPY DRIVE**

- 100% IBM compatible
- 360K byte capacity and 48 TPI

\$119



IBM, AT & T AND COMPAQ ARE REGISTERED TRADEMARKS.

VISA OR MC ADD 3% TO ALL PRICES

# It's Your Move To Improve!

For years we have been selling our products through distributors hoping that they will provide better technical support and services to our customers. Lately, we find that most of them are not really technical and sensitive enough to satisfy our customer needs. In order to provide quality products and services at factory prices, we have decided to sell to you direct by passing distributors. Each of our products comes standard with an easy do-it-yourself installation guide. If you still have problems, our highly trained technical staff is only a phone call away to answer any of your questions.

To further back up our commitment for high quality and better services, our policy is one year warranty and a 30-day no-questions-asked money back guarantee on most of our products.

Remember. No loss. No stalemate. Make your move to improve. Call us at our hotline.

IN USA CALL: 800-JEDEN US  
 IN CALIFORNIA CALL: 800-JEDEN CA  
 For a free catalog, call 714-545-8108  
 CIRCLE 160 ON READER SERVICE CARD

**JEDEN**  
 COMPUTER PERIPHERALS  
 16450 Harbor Blvd. Suite C-15  
 Fountain Valley, CA 92708

IN CANADA 416-842-3177  
 912 Barton Street, East, Suite 26  
 Hamilton, Ontario, Canada L8L3C2

# BEFORE YOU GET ON THE WRONG TRACK, READ THIS ABOUT THE ONLY ROM-BOOTABLE, PLUG-COMPATIBLE, XENIX SUPPORTING, HEAD-CRASH PROTECTED, HIGH-PERFORMANCE HARD DISK UPGRADE KIT FOR YOUR IBM PC-AT.

Rotary Voice Coil (RVC)  
R/W head positioner  
Fast and Accurate

Recording Media  
99.94% error free unformatted  
100% error free formatted.  
Maximum data density is  
10Kb/MB.

Up to 30% faster  
than IBM's drive.  
Exceeds IBM specification  
for AT high-performance  
hard disk. Average Access  
20 @ 30 MB/sec.  
40, 56, 72 MB, 28 ms

Bootable ROM supports  
DOS and XENIX  
Only from CORE.

## THE BALANCING ACT OF 1985.

You didn't buy an IBM PC-AT just to balance your checkbook. You bought it to crunch lots of numbers and words, in the shortest possible time. A labor saver. A time saver.

Hence, a money saver. So, do your part for effective money management; hard disk storage is no place to be penny-wise and pound foolish.

## TELL 'EM YOU NEED HIGH SPEED AND DATA PROTECTION.

These and other important features do add cost, but that makes a premium drive.

Anything that can be made, can be made cheaper, sell for less, offer lower performance, and probably die young.

Remember, usually you get what you pay for, and you ALWAYS get what you don't.

## ALL HARD DISKS ARE NOT CREATED EQUAL.

There are vast differences in the speed and reliability of Winchester hard disks. Since the IBM PC-AT is an incredibly fast machine, a slow drive can make an AT run like an XT.

So, before you get stuck with a slow drive in an AT, save your boss two grand and buy an AT.

Or better yet, buy the AT and avoid any drive with Access Times over 40 milli-seconds.

## RELIABILITY: WHERE HAS ALL THE DATA GONE?

Now tell 'em the drive must have a data protection scheme. One that's easy to use and reliable.

Winchester heads read and write while "flying" a few microns above the data surface. If the heads contact the recording media, you risk a head crash, and significant or total data loss.

So, even a fast drive without data protection is virtually worthless. Frankly, we'd rather sleep at night.

## BEWARE OF USER-DEPENDENT PROTECTION SCHEMES.

Some drives have a safe landing zone for the heads, but you need to call a separate program to send 'em there. If you don't call that program, and most folks won't, the heads in those drives ALWAYS land on data when powered down.

The slightest bump or vibration can move the heads, wiping out those data tracks. And the R/W heads can become contaminated, thus increasing the error rate, slowing down average access until the whole drive fails.

Consequently, those drives offer a very high risk of head crashes, a false sense of security, and little else.

What's your data worth? \$200? \$400? Specify AUTOMATIC data protection. ATplus has it. And it doesn't cost, it pays.

## PEACE OF MIND.

Specify AUTOMATIC park and lock of the heads on power down.

This system provides unparalleled head crash protection, by sensing power loss to the drive, and retracting the heads to a dedicated landing zone before they can land on your data.

Since this is 100% automatic, user-dependent risk is eliminated.

## OUR DRIVES HAVE ALL BEEN TO BOOT CAMP.

Avoid drives that CLAIM PC-AT compatibility but can't BOOT the AT. By the time you juggle the

diskettes necessary to use one of those drives, the phrase "user-hostile" will have deep personal significance.

We believe that computers ought to serve people, not the other way around.

## BEWARE OF THE BARGAIN BAND-SCHLEPPER.

Avoid drives with inexpensive Hand-Stepper positioner technology. These were pretty good way back in 1981, considering that it's all anyone had. But by today's standards, they're inaccurate and very mechanical.

They waste time looking for the right track to read or write. And they're worth no where near the price you'll pay for 'em—in more ways than one.

## THE HIGH TECH SOLUTION.

Specify state-of-the-art ROTARY VOICE COIL (RVC) head positioner and CLOSED LOOP SERVO technologies.

This system uses a DEDICATED SERVO SURFACE (DSS) for continuous head location information.

The RVC and DSS use a large scale microprocessor to translate user track-seek commands into current that is applied directly to the RVC.

# ATplus™

ATplus drives are  
now manufactured  
for CORE by



Full one year warranty.  
Service available worldwide  
(drive shown with cover removed)

Automatic Park & Lock (APOL)  
Senses power interrupt, retracts  
heads to safe landing zone. Heads  
never land on data, virtually  
eliminating risk of data loss.

## Memory options.

18 - 128 Kilobits (150ns) D-RAM  
chip set. Adds 256 KB to PC-AT  
basic model making 512KB PC-AT.  
With an ATplus drive, you can  
slide above with ease removed  
built in the first place.

This moves and holds the R/W heads at the exact track intended.

Speed is dramatically increased since head movement is created electronically, with minimal mechanical interfacing.

## BESIDES BEING THE SOLE SOURCE.

Specify names you know and can trust. Like Control Data Corporation, a world leader in hard disk technology. And CORE INTERNATIONAL, a growth company with over ten years in computer technology, design and manufacturing.

## ATPLUS, IDEAL FOR THE SPECS MAN.

ATplus High Performance Hard Disk Upgrade kits, available in 20, 30, 40, 56, and 72 MB capacities.

They have ALL the above features and none of the shortcomings of "bargain" drives.

And your AT will accept any two ATplus drives, for up to 144MB of bootable, reliable, DOS and XENIX supporting high-performance on-line storage, all inside the box.

## TELL YOUR DEALER...

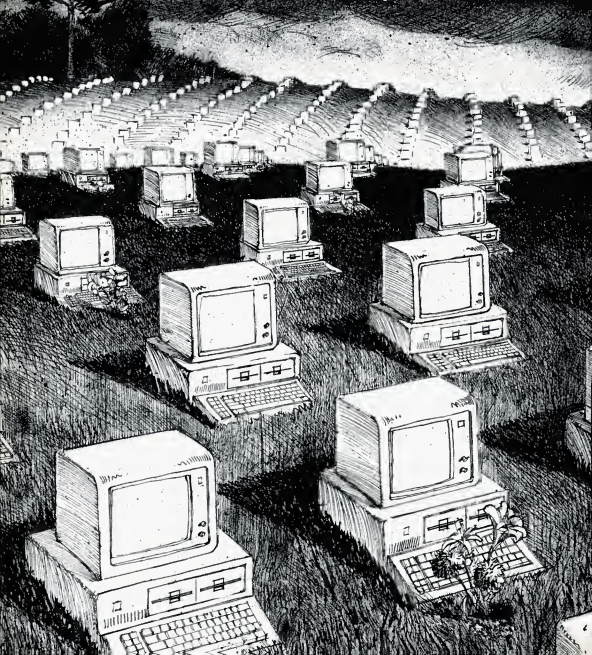
That only ATplus Hard Disk Upgrade Kits from CORE will do.

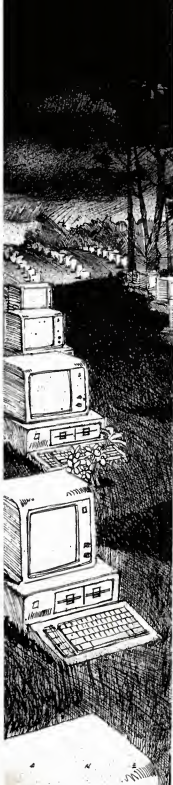
The only reason you have 'em, we'll gladly set them up as ATplus authorized dealers.

# CORE INTERNATIONAL

542 S.E. 5th Avenue • Delray Beach, Florida • 305/276-3929

Hardcard can save  
2,500,000 PCs  
from an untimely end.





It's a grave situation.

Millions of IBM PCs and compatibles can no longer handle the growing needs of the business world.

Because users like you are demanding more and more storage space.

For bigger programs. Like marathon spreadsheets and Olympic-sized memos. Or for new applications like downloading from the mainframe to the micro.

Which is why a lot of PCs are being replaced with expensive XT's.

But now you can save your PC. And save yourself (or your company) lots of money.

With Hardcard.\*

A 10 megabyte hard disk drive on a card that instantly transforms a PC\* into an XT. In fact, the only difference is that Hardcard is faster than the XT's built-in drive.

Hardcard also saves you installation time. Because everything is compressed onto a single card that quickly plugs into any expansion slot inside the PC. With no cable connections. No external power supply. No adapter cards to buy.

And with our special installation software, you can load the operating system and be ready to install your programs in minutes.

Hardcard also saves the money

you've invested in software. Because it runs all the most popular business programs exactly like an XT would. With no extra fuss or modification. And its built-in Hardcard Directory program lets you easily access your most valued files and programs at the touch of a key.

Plus Hardcard is the only add-on drive that lets you keep both your floppies up and running.

As for reliability, there's simply less to go wrong. In fact, Hardcard has fewer parts than any other drive. Which makes it twice as reliable as the XT's built-in drive.

Because of this superior reliability, we can offer you a warranty that goes well beyond the usual 90 days. We give you a full year. Should anything go wrong within the year, take it to your nearby authorized service center, and you'll get a replacement Hardcard the same day.

Best of all, Hardcard is affordable enough to save all the PCs. Including yours.

And it's available now at computer retailers nationwide. For the one nearest you, write Plus Development Corp., 1778 McCarthy Blvd., Milpitas, CA 95305. Or call

(408) 946-3700. But do it right now. Because the end is near.

\*Hardcard is compatible with IBM PC, IBM PC XT, Compaq Portable, Compaq Plus, AT & T PC 6300.  
Plus and Hardcard are trademarks of Plus Development Corporation. IBM, IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Compaq, Portable and Compaq Plus are trademarks of Compaq Computer Corporation. AT & T PC 6300 is a registered trademark of AT & T Information Systems, Inc.

**Hardcard**  
from Plus

CIRCLE 365 ON READER SERVICE CARD

# "I Program In BetterBASIC And I Recommend It."

"My company uses BetterBASIC to control the automation system on board ships. It gives us the excellent feature of flexibility and quick change of process dependant logic. We save the logic in E'p'rom (electrically erasable programmable ROM) so online changes can be made instantly. I use BetterBASIC and I recommend it."

Ken Moller • Norcontrol • Horten, Norway

**640K** Now you can use the full memory of your PC to develop large programs.

**STRUCTURED** Create well organized programs using procedures and functions that are easily identified and understood and completely reusable in future programs.

**MODULAR** Use procedures and functions grouped together to form "library modules" which are then available to you or anyone else for future use.

**EXTENSIBLE** Create your own BetterBASIC modules which contain BetterBASIC extensions. This feature coupled with the easy-to-use Assembly Language support, makes this an ideal OEM language.

**INTERACTIVE** BetterBASIC acts like an interpreter because it responds to the users' commands in an immediate mode. However each statement is actually compiled as it is entered.

**COMPILED** Each line of the program is compiled as it is entered into the computer's memory rather than interpreted at runtime.

**RUNTIME SYSTEM** The optional Runtime System generates stand alone EXE. files allowing for the distribution of products



written in BetterBASIC with no royalties.

**SUPPORTS** Windows, Graphics, DOS and BIOS ROM calls, Chaining, Overlays, Local and Global Variables, Recursion ... and more.

**BetterBASIC** Runs on IBM PC, XT, AT and all IBM-compatibles. Ask your local dealer for BetterBASIC or call 1-800-225-5800 in Canada call 416-469-5244. Also available for the Tandy 1000, 1200, AND 2000 AT Tandy/Radio Shack stores.

## Summit Software Technology, Inc.™

P.O. Box 99, Babson Park  
Wellesley, MA 02157

### PRICES:

BetterBASIC	\$199
8087/80287 Math Module	\$99
B'Trieve™ Interface	\$99
Runtime System	\$250
Sample Disk with Tutorial	\$10

*Better*  
**BASIC.**

## Because It's The Best.

CIRCLE 364 ON READER SERVICE CARD

MasterCard, Visa, Checks, Money Order, C.O.D. accepted and P.O. on approval.

BetterBASIC is a registered trademark of Summit Software Technology Inc. IBM PC, XT, AT, are registered trademarks of International Business Machines Corp. Tandy is a registered trademark of Tandy Corp. B'trieve is a registered trademark of SoftCraft Inc.

(If you're using BetterBASIC and would like to be featured in one of our ads, please write to the Director of Advertising at Summit.)

# Complete Accounting Software Including Payroll for \$15 per module

## 101 Profitable Reasons To Buy MCBS Accounting Software!

### General Features

- 1) Menu Driven System
- 2) Integrated or Stand Alone
- 3) Simplified Installation
- 4) Complete Audit Trails
- 5) Data Files can be accessed by Lotus, dBase, etc. \*
- 6) Manuals on diskettes, print them on your printer.
- 7) Modules can be purchased separately.
- 8) Accounts and transactions limited only by disk space.

### General Ledger

- 9) Supports multiple departments
- 10) Flexible chart of accounts.
- 11) Prints financial statements in flexible, user defined formats.
- 12) Prints Income Statement and
- 17) Balance Sheet by current month, current quarter, and 3 previous quarters.
- 18) Prints Departmental Income
- 23) Statement and Balance Sheet by current month, current quarter, and 3 previous quarters.
- 24) Prints Budget Comparison
- 25) Income Statement and Balance Sheet comparing Actual vs. Budget with variances and ratios.
- 26) Prints Trial Balance and Chart
- 27) of Accounts
- 28) Prior Period Adjusting Entries do not impact current results.
- 29) Data Entry screen displays beginning, current and ending balances as well as the last 10 entries.
- 30) System allows new accounts to be created during data entry.

### Accounts Payable

- 31) Provides for entry, updating and deletion of vendor information.
- 32) Allows entry, editing and posting
- 33) of payables, adjustments, cancellations and prepaids.
- 34) Prints the Open Item & Cash
- 35) Requirements reports.
- 36) Allows partial payments.
- 37) Prints A/P checks
- 38) Prints Check register.
- 39) Prints the A/P distributions to the General Ledger
- 40) Prints the vendor analysis report.
- 41) Interfaces to MCBS' General Ledger or may stand alone.

### Accounts Receivable

- 42) Provides for entry, updating and deletion of customer information
- 43) Allows entry, editing and posting of receivables, credit memos, cash payments.
- 44) Allows up to 99 repetitive line items for fast invoicing.
- 45) Prints the open item and aged receivables reports.
- 46- Prints Invoices, Credit Memos
- 48) and Statements.
- 49) Prints Sales Analysis.
- 50) Supports Partial Payments
- 51) Prints Invoice, Payment and Credit Memo Registers.
- 52) Interfaces to MCBS' General Ledger or may stand alone.

CIRCLE 168 ON READER SERVICE CARD

### Payroll with State & Local Taxes

- 53) Provides for entry, updating and deletion of employee information.
- 54- Handles hourly, salaried or
- 56) commissioned employees on weekly, biweekly, semi-monthly or monthly pay periods.
- 57) Calculates Federal, State and Local Taxes.
- 58) Allows user to maintain all tax tables.
- 59) Maintains payroll history.
- 60) Calculates the payroll.
- 61) Prints the payroll register, check register and deductions register.
- 62) Prints payroll checks.
- 63) Provides for after-the fact payroll
- 64- Provides W-2's, 1099's, and 941's
- 67) # prints quarterly earnings reports.

### Inventory with Order Entry & Purchase Orders

- 68) Uses for LIFO and Standard Cost.
- 69) Provides for inventory item entry, updating and deletion.
- 70) Provides for order entry and editing with inventory update during entry.
- 71) Stock and non-stock items.
- 72) Handles purchases, returns, shipments and adjustments.
- 73) Prints invoices, credit memos, picking tickets, purchase orders, price lists and shipping labels.
- 74) Prints on preprinted forms or plain paper.
- 75) Prints stock status report and purchasing advice report.
- 76) Full back order retention.
- 77) Quarterly, yearly and prior year inventory history.
- 78) Performs book to physical analysis.
- 79- Over 20 management reports
- 99) including extensive Sales Analysis and Lost Sales Report.
- 100- Interfaces to MCBS' General
- 101) Ledger, A/R, A/P or may stand alone.

**Any Module For \$15 ea.  
Or All 5 For \$50 Total**

TO ORDER CALL:  
1-800-334-0884, Ext. 826  
For More Information:  
call (713) 444-6269



**Micro Computer Business Services**

12703 Stuebner Airline Houston, TX 77041

Complete Package - G/L, A/P, A/R, P/R, INV	QTY. _____ X \$ 50.00 ea. = _____
Individual Module - G/L/A/P/A/R/P/R/INV	QTY. _____ X \$ 15.00 ea. = _____
Accountants' Client Write-up System	QTY. _____ X \$150.00 ea. = _____
Pay Method: Prepaid, Check Enclosed: _____	Texas Residents Add 6 1/4% = _____
MC, # _____	Shipping Charges = <b>6.00</b>
VISA, # _____	If COD add \$5.00 = _____
Expires: _____ Signature _____	<b>TOTAL = _____</b>
Company Name: _____	Contact: _____
Street/Number: _____	Phone: _____
City: _____	State: _____ Zip: _____

## Accountants ONLY...

### Accountant's Client Write-up System

- 1) Designed for Accountants
- 2) Allows multiple clients on same disk, accessed by client code.
- 3) Allows new accounts or new employees to be entered from data entry screen.
- 4) Supports multiple departments.
- 5) Running balance shown on screen during data entry.
- 6) Payroll entries made from same entry screen as other entries.
- 7) Accumulates all payroll information and prints Quarterly payroll reports including 941's
- 8) Prints W-2's and 1099's.
- 9) Produces client bill on a variety of bases.
- 10) Produces more than 12 reports including Changes in Financial Position, Income Statement, Balance Sheet, Detailed General Ledger.
- 11) Includes automatic report printing.

**\$150**

All programs run on IBM (PCjr/PC/XT/AT), AT&T, EPSON, TANDY (1100/1200/2000), TI, WANG, COMPAQ, CORONA, SANYO, COLUMBIA\*, and MS-DOS machines.

Requires 128K Ram, 2 Floppies or Fixed Disk, 80 Column Printer, MS-DOS, PC-DOS 2.0 or later.

\*Computer & software names are trademark or registered by their respective manufacturers.

### MONEY BACK GUARANTEE!

#### Service Contract

Telephone consultation - \$50/yr.

Shipping charges \$5.00

Texas Resident add 6 1/4% Tax

COD Charges \$5.00

Payment by Check, MC or VISA

**ATTENTION DEALERS!!!!** Call or Write Now for the VERY BEST MARGINS (over 50%) in the industry.





IF YOU'RE TIRED OF PAYING OUTRAGEOUS LONG DISTANCE CHARGES EVERY TIME YOUR COMPUTER TALKS ON THE PHONE, GTE Telenet OFFERS AN ALTERNATIVE. IT'S CALLED PC PURSUIT™

NOW FOR ONLY \$25 A MONTH (PLUS A ONE-TIME INSTALLATION FEE OF \$25) YOU'LL BE ABLE TO REACH OTHER PC SUBSCRIBERS. FREE LOCAL DATA BASES AND BULLETIN BOARDS IN ATLANTA, BOSTON, CHICAGO, DALLAS, DENVER, DETROIT, HOUSTON, LOS ANGELES, NEW YORK (AREA CODE 212), PHILADELPHIA, SAN FRANCISCO AND WASHINGTON D.C. AND TAKE ADVANTAGE OF LOCAL SOFTWARE DOWNLOADING CAPABILITIES, AS WELL.

YOU CAN USE THE PC PURSUIT SERVICE BETWEEN 6PM AND 7AM WEEKDAYS, AND ALL DAY ON WEEKENDS. ALL YOU NEED IS AN AUTO-ANSWER MODEM AND COMMUNICATIONS SOFTWARE.

AS PART OF GTE Telenet'S DATA NETWORK, THE PC PURSUIT SERVICE OFFERS THE QUALITY, RELIABILITY AND ACCURACY NEEDED IN THE PURSUIT OF INFORMATION.

FOR MORE INFORMATION CALL 800-368-4235 BETWEEN 9AM AND 5PM. AFTER HOURS CALL 800-835-3001 ON YOUR TERMINAL TO SIGN UP AND START USING THE SERVICE. OR USE THIS SECOND NUMBER TO GET OUR ON-LINE USERS GUIDE.

WITH PC PURSUIT, YOU CAN FINALLY GET YOUR HANDS ON THE INFORMATION YOU NEED, WITHOUT PAYING AN ARM AND A LEG.

**GTE Telenet**

CIRCLE 229 ON READER SERVICE CARD

NOW YOU DON'T HAVE TO PAY THIS MUCH  
TO ACCESS INFORMATION WITH YOUR HOME COMPUTER.

# COMPUTER HUT

COMPARE  
OUR  
SERVICE & PRICE!

IBM-PC, XT & AT  
CALL



## COMPAQ®

Portables, Deskpros, 286 Models CALL

## ITT

XTRA 2DR, 256K \$1395

## DISK DRIVES

Tandon TM100-2 DS/DD \$109

TEAC FD 55-B Slimline \$115

IBM® drives w/floppy \$129

## HARD DISKS/TAPE

## ME MAYNARD ELECTRONICS

Hard disks & tape back-ups complete with  
cords & cables.

WSO 10, 20, 30 meg from \$675

MaynardStream Portable tape backup &  
Portable hard disk systems CALL

MEGA Barnoulli 20 Meg \$2495

ALLOY full line CALL

IRWIN tape backups from \$549

## ADD-ON BOARDS

## QUADRAM

Quadboard 0K exp. to 384K \$219

Microfazer 64K parallel \$229

## AST

SixPak Plus 64K \$239

I/O mini Ser Port & Clock \$139

Advantage 128K \$399

## dea

IRMA board \$695

## ORCHID

PCTurbo-186 w/128K \$625

## HERCULES

HiRes Mono Graphics \$309

Color Graphics wipar port \$175

## PARADISE

Modular Graphics \$269

5-Pack 0K exp. to 384K \$159

## PERSYST

Mono Card wipar port \$169

## TECMAR

Graphics Master \$469

Maestro 128K \$399

## MODEMS



Smartmodem 1200 \$399

Smartmodem 1200B w/smartcom II \$369

Smartmodem 2400 \$639

## NOVATION

Smart Cat Plus w/MITE \$299

## PRINTERS

## EPSON

FX-85, FX-185, LX-80, JX-80, RX-100, LQ-1500,  
DX-10, DX-20, HI-80 plotter, HS-80 ink jet —

BEST DEAL — GUARANTEED!

## brother

HR-10 \$299 HR-15XL \$369

HR-25 \$569 HR-35 \$749

Twinkwriter 5 \$699

FACIT CALL



HEWLETT PACKARD CALL

## OKIDATA

182, 192, 93, 193, 84, 2410. BEST PRICES

## NEC

2050 \$699 3550 \$1095

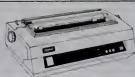
8850 \$1549 efi 360 \$459

Pinwriter P2 \$549 P3 \$775

## TOSHIBA

P351 \$1195 P1340 \$595

## ACCESSORIES.....CALL



## SPECIALS

### PARADISE SYSTEMS

### MODULAR GRAPHICS CARD

Runs all IBM Color graphics  
software on IBM Mono &  
Color Monitors \$249

5-PACK w/DK-expandable to  
384K, Ser. Port, clock, Ram disk  
& print spooler \$139

ASK ABOUT OUR  
REPAIR SERVICES.

## MONITORS

### AMDEK

Video 300G \$129 300A \$139

Video 310A \$179

### PGS

HX12 \$479 HX-12E \$559

MAX-12E \$189 SR-12 \$599



## SOFTWARE

### WORDPROCESSING

MS Word \$239 Multimate CALL

Volkswriter deluxe \$159

PFS: Write \$85 WordPerfect \$239

WordStar propack \$299

Wordstar 2000 \$259

### DATABASE / INTEGRATED

dBase III CALL Framework CALL

Lotus 1-2-3 \$299 Symphony \$429

Jazz CALL

RBase 5000 \$369 Cornstone \$299

### BUSINESS / ACCT.

Microsoft Project, Chart \$159

Harvard Total Project Mgr \$289

PFS File, Plan, Graph \$65

BPI Accounting CALL

### UTILITIES / COMPILERS

Sideways \$39 Smartcom II \$99

Superkey \$55 Norton Utilities \$65

Sidekick NP \$55 Turbo Pascal \$49

MS Basic \$239 MS Fortran \$219

LIFEBOAT Lattice C \$299

STARBRIDGE DOS \$39

### TRAINING / OTHER

ATI TRAINING POWER

Teach yourself: Lotus 1-2-3, dBase III,  
Multimate, Jazz \$49

### ATI SKILL BUILDER

How to use: PC DOS, IBM PC, Database,  
Wordprocessing \$39

Typing Tutor III \$39 Gato \$29

Flight Simulator \$39

## AND LOTS MORE

ANY PRODUCT NOT  
LISTED? CALL

## EAST COAST

### COMPUTER HUT

OF NEW ENGLAND, INC.

101 Elm St. Nashua, NH 03060

(603) 889-7625

For Orders Only — (800) 525 5012

## CANADA

### MICROCONTEXT

AUTHORIZED DEALER

4847 Ave Du Parc

Montreal Que H2V4E7

(514) 279-4595

## MID-WEST

### COMPUTER HUT INC.

524 S. Hunter

Wichita, Kansas 67207

(316) 681-2111

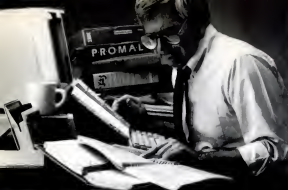
For Orders Only — (800) 572 3333

All products usually in stock for immediate shipment and carry full manufacturers' warranty. Price subject to change — this ad prepared two months in advance. We honor personal checks — allow 30 days to clear. C.O.D. up to \$500. Visa, MasterCard add 2% for shipping & insurance add 2% or \$6.00 min. for small items and \$12 min. for monitors, printers, etc. We accept company checks and PO's from Fortune 1000 Companies.

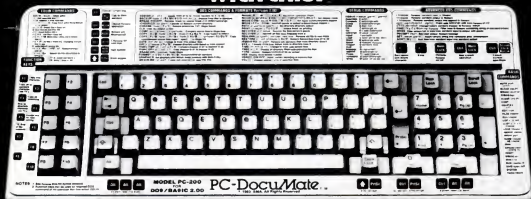
IBM is a trademark of IBM Corp.

Return authorization and order status call information line

1085



**Instead of this... ...you can have this  
with this!**



**\$14.95**

Why waste time digging through cumbersome manuals for operating commands? **PC-DocuMate™** templates put computer commands at your fingertips for the **IBM® PC, PC-XT, PC-AT, Compaq®, Apple® IIe and Commodore® 64.**

You'll have quick reference for needed commands, options and formats right on your keyboard with a **PC-DocuMate** template.

Our professionally designed, two-sided templates are made of durable, non-glare plastic. Satisfaction is guaranteed—fully—or your money back.

*Templates Now Available—*

**IBM PC/XT and COMPAQ:**  
DOS/BASIC (2.0, 2.1 & 3.0) • 1-2-3 •  
Symphony • dBASE II • dBASE III  
• Framework • MultiMate  
• WordStar and WordStar 2000+ •  
EasyWriter II •  
MULTIPLAN (IBM or Microsoft) •  
PeachText 5000 • SUPERCALC<sup>3</sup>  
• VisiCalc • TURBO Pascal •  
WordPerfect • VOLKSWRITER  
DELUXE • Do-It-Yourself.  
**PC/AT: DOS/BASIC (3.0 & 3.1) •**  
dBASE III • 1-2-3 •  
WordPerfect • MultiMate.  
**COMMODORE 64 (\$12.95):**  
C-64 BASIC • EasyScript •  
CalcResult • Do-It-Yourself.  
**Apple IIe: AppleWriter II •**  
WordStar • VisiCalc • dBASE II  
• Quickfile • Do-It-Yourself.

*How to Order:*

To order by credit card call toll free

**1-800-762-7874**

(In NC call 919-878-3600)

Or mail us your personal check, money order or MasterCard/Visa information. NC residents include 4.5% sales tax. Please add \$1.50 for shipping and handling per order. (Foreign orders, except Canada, add \$15.00 per order). U.S. funds only. No CODs.

*Our Guarantee: Use your template for 20 days. If you are not completely satisfied return it to us (undamaged) for a full refund.*

**SSA**

Systems Management Associates  
3325 Executive Drive, Dept. B-10  
Raleigh, North Carolina 27609

# Arlington Computer Products gives you the best prices on IBM PCs...

## IBM-PC

2 Drives - 256K  
Monochrome Monitor

**\$1925**

COLOR MONITOR \$2175

## XT

1 Drive - 256K  
10 MB Hard Disk  
Monochrome Monitor

**\$2549**

20 MB HARD DISK \$2675

## AT

1.2 Floppy - 512K  
20 MB Hard Disk  
Monochrome Monitor

**\$4199**

30 MB HARD DISK \$4499

## COMPAQ PORTABLES

2 Drives, 640K  
w/Clock

**\$2125**

1 Floppy, 640K w/Clock,  
10 MB Hard Disk

**\$2599**

CALL FOR QUOTES ON  
OTHER COMPAQ SYSTEMS

### ...and disk drives too!

IBM (WHILE SUPPLIES LAST)	\$ 99
TANDON TM100-2	\$ 99
SHUGART SA455	\$ 79
TEAC FD55B	\$ 84
360K Drive for AT	\$ 119

### 10 MB HARD DISKS

from **\$429** 20 MB HARD DISKS  
from \$599

### 10 MB TAPE BACK UP \$479

## ★ ISSUE HIGHLIGHTS ★

AST 6 PACK w/384K  
Clock/Calendar, P.S.  
and 384K

**\$259**

HAYES  
1200B

**\$339**

HERCULES  
COLOR CARD

**\$145**

QUADBOARD w/384K  
Clock/Calendar, P.S.G.  
and 384K

**\$239**

EVEREX  
GRAPHICS EDGE

**\$279**

PERSYST  
COLOR CARD

**\$125**

EVEREX MAGICARD w/384K  
Clock/Calendar, P.S.G.  
and 384K

**\$219**

APPARAT  
256K BOARD  
w/256K

**\$115**

PRINCETON  
HX 12  
(includes cable)

**\$419**

## PRINTERS

### EPSON

LX 80	\$229
RX 100	\$369
FX 85	\$335
LX 185	\$469
FX 1500	Call

### OKIDATA

ML192	\$359
ML193	\$499
84 IBM	\$639

### SILVER REED

EXP 400	\$249
EXP 500	\$289
EXP 550	\$399
EXP 770	\$699

### TOSHIBA

1340	\$549
P351	\$1069

## PERIPHERALS

STB GRAPHICS PLUS II	\$249	AST ADVANTAGE	\$399
PARADISE MODULAR GRAPHICS	\$259	AST 5251-11	\$649
HERCULES GRAPHICS CARD	\$289	HAYES 1200	\$379
HERCULES COLOR CARD	\$145	64K RAM CHIPS	\$ 9
EVEREX GRAPHICS EDGE	\$279	Bank of Nine	
TAXAN 440 & Super Hi-Res Board	\$769	256K CHIPS ea.	\$ 5
PERSYST MONOCHROME CARD	\$139	128K CHIPS ea.	\$ 7

**Arlington  
Computer  
Products**

450 E. HIGGINS ROAD  
ELK GROVE VILLAGE, IL 60007



FOR ORDERS & SYSTEMS QUOTES:

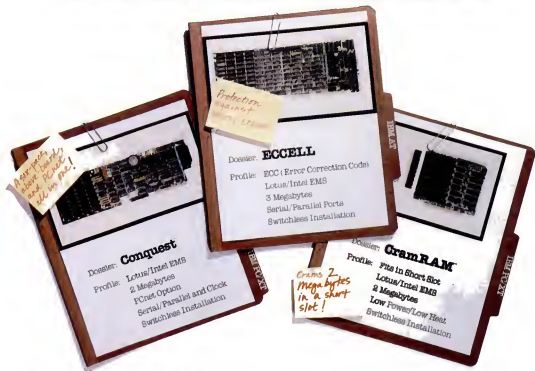
**800-548-5105**

FOR INFORMATION AND IN ILLINOIS CALL 312-228-6333

CIRCLE 114 ON READER SERVICE CARD

Prices and Availability Subject To Change Without Notice

# INTRODUCING ORCHID'S S.W.A.T. TEAM



## **The Multifunction Force That's Superstuffed With Advanced Technology.**

Every member of this team has the technology you need to get the job done: Lotus/Intel Expanded Memory Specification (EMS) breaks the 640K DOS limit. Powerful Productivity Software including Disk Caching, RAM Disk and Print Spooling.

Switchless design makes installation easy and fast. All these boards come with a Two Year Warranty to prove our team means business.

## **Finally, advanced technology in multifunction boards.**

47790 Westinghouse Drive • Fremont, CA 94539  
(415) 490-8586 • Telex 709289

ECCELL, Conquest and GramRAM are trademarks of Orchid Technology. Other products named in this document are trademarks of their manufacturers.



CIRCLE 177 ON READER SERVICE CARD

# Guerrillas in the Computer Revolution

Can a new small computer compete with IBM? Commodore's Amiga and Atari's ST, with nothing going for them but technical excellence, have entered the battle against the giant.

**T**he Commodore Amiga and Atari 520 ST are too good to ignore, even if you are an IBM aficionado. Although these computers aren't likely to seriously affect IBM's domination of the business market, there's a chance they can rekindle the dying embers of the personal computer revolution. Like the Apple Macintosh of 2 years ago, the Amiga and Atari are bold attempts to escape from the 1981 IBM PC standard that has blanketed the industry.

The Amiga has super graphics and sound and comes as a traditional "three-piece" package (system unit with built-in disk, monitor, and detached keyboard). The Atari ST, or "Jackintosh," is a simple color Macintosh packaged as a keyboard, not unlike the best-selling Commodore 64. A two-drive Amiga with 512K bytes of memory and a color display costs about \$2,300, while a two-drive Atari ST with 512K and a color display costs about \$1,000 less. (The Amiga drives each store 880K, while the optional double-sided ST drives hold 720K each.)

The Amiga uses high-powered custom VLSI coprocessor chips that support advanced graphics and produce stereo sound. It has a powerful but complex multitasking operating system that takes advantage of the parallel operation of the custom chips. Amiga also offers an optional emulator that is supposed to run many of the top IBM PC programs.

Commodore doesn't like to admit it, but its Amiga is a superior video game machine. Both the history of the project and its final specifications suggest that the Amiga was designed to be an under-\$1,000 home game machine. When the

home computer mania died, Commodore repositioned Amiga as a productivity computer that also has outstanding video capabilities. The last time such an operation was performed—on the Mindset—the results were not encouraging. The patient



Ron Jeffries

lived but has not enjoyed a very productive life.

The Atari ST is much less ambitious than the Amiga. It is the result of a very short design cycle, which started barely a year before the ST was shipped. The ST is basically a cost-reduced 512K Macintosh with a color display, high-speed direct memory access (DMA) for a hard disk, and a full keyboard with numeric pad, cursor, and function keys. The TOS operating system used by Atari is single-tasking.

## Bit-Mapped Is Better

What makes the Amiga and Atari ST special? First, they are unabashedly bit-mapped machines, like the Macintosh and

Xerox Star before them. Second, like the Macintosh, they use the Motorola 68000 processor instead of the Intel 8088 that's in the original PC. Third, these new computers offer lots of bang for the buck. And last, the personal computer industry could use a fresh dose of competition.

In sharp contrast to the IBM PC world, where bit-mapped graphics are the exception rather than the rule, the Amiga and the Atari ST are pure bit-mapped machines with strong graphics support. Lots of PC folks still use the character-oriented IBM monochrome adapter. While there are many bit-mapped PC displays—including the Enhanced Graphics Adapter (EGA), the original color/graphics card, the Hercules card, and at least half a dozen others—there are far more character displays in today's PC world.

So far, IBM has made a bit-mapped display with adequate resolution optional on the PC and has not standardized a visual user interface. Before GEM from Digital Research or Windows from Microsoft can succeed, the PC must have a common-denominator bit-mapped display.

Now that less expensive computers such as the Atari and Amiga are available with good resolution bit-mapped displays, it is obvious that the next generation of IBM PCs will have a standard EGA 640-by-350-pixel bit-mapped display. Before IBM can go beyond that level of resolution, the cost of high-bandwidth CRT displays needs to come down.

The good news, however, is that computer-aided engineering (CAE) and computer-aided design (CAD) applications for PCs are generating intense demand for better displays. Within 2 years you should be

## QUANTUM LEAP

able to buy analog RGB color monitors that will display a crisp 1024- by 1024-pixel resolution, but they will cost about the same as today's medium-resolution digital RGB monitors.

### The 8088 Is D-E-A-D

The Macintosh, Amiga, and Atari ST all use the Motorola 68000 processor instead of the Intel 8088 that's in the PC and XT. I haven't yet done formal benchmark

tests comparing the Amiga and Atari with each other or with the PC, but software developers tell me they are generally competitive with the Intel 80286-based IBM AT.

Spending a few minutes with either the Amiga or the Atari will convince you that the Intel 8088 processor used in the current PC is D-E-A-D. Yes, I'll continue to use mine and may even add a megabyte or two of memory one of these days—but my next computer will have either a 286 or a 68000 in it.

With Amiga and Atari both using the 68000, there is little doubt that IBM will use the more powerful 286 microprocessor in their 1986 replacement for the current PC and XT. But when it does, it will have to enhance the current AT to keep it positioned as a high-performance model. IBM might run the new 286-based PC at 6 MHz, for example, and speed the AT up to 10 or 12.5 MHz. And in another year or so, IBM should announce a new high-end PC that uses the 32-bit Intel 386 power-house processor chip.

Both Atari and Commodore are already designing more-powerful models. For example, Atari will soon announce a computer that uses the faster 32-bit 68020 processor and has 4 megabytes of RAM. They also are working on a CAE/CAD workstation that uses the National 32032 32-bit processor.

### Value for the Dollar

The price/performance ratio of today's IBM PC doesn't compare favorably with the aggressively priced Amiga and Atari 68000 systems. For instance, a basic EGA graphics card for the PC costs \$524 and a fully expanded card is \$982. You'll also need the 5154 enhanced color display—another \$849—bringing just the display portion of a "full-on" bit-mapped IBM system to more than \$1,800.

Although not a totally fair comparison, it's interesting to note that \$1,800 is about what you'd pay for a 256K Amiga with one 880K 3½-inch floppy disk and an analog RGB monitor. The Amiga will support more colors on the screen at one time and has a palette of 4,096 colors, compared with the expanded EGA's 64 colors. Furthermore, the Amiga's custom chips support extremely fast graphics operations that can't be done on the EGA at all.

## ACCOUNTING FOR MICROS

**\$395**

Set of Four

**\$325** Set of Three

**\$465** Set of Five

**ACCOUNTING FOR MICROS** is a fully integrated accounting program which meets professional standards. They're fast and easy to use, with complete instructions. Our manual (shown above) also includes helpful information on bookkeeping and computers.

**GENERAL LEDGER** ..... \$125  
Allows up to 1,000 accounts & 1,000 transactions/month. Retains stored balances for Last year, This Year and Forecast. Includes: Cash Disbursements, Cash Receipts and General Journals. Reports include Balance Sheet, Income Statement, Annual Summaries and Journal Reports.

**ACCOUNTS RECEIVABLE** ..... \$125  
Allows up to 2,500 customers and 1,000 invoices per month. Investing categories. Inventory Module. Keeps customer names and addresses. Invoice prints on plain paper or any pre-printed form. Statements can be printed at any time.

**INVENTORY** ..... \$125  
Allows up to 4,000 parts. Keeps 3 month history of unit sales as well as year to date. With AR, can be used as point of sale system (prints invoices, handles cash). Reports include Inventory Value and Stock Report, Internal and Customer Price List.

**ACCOUNTS PAYABLE** ..... \$125  
Allows up to 1,000 vendors and 1,000 invoices. Records monthly and handwritten checks. Computer checks on any pre-printed form. Keeps vendor names and addresses.

**ROLL** ..... \$125  
Will handle up to 100 employees with eight deductions per employee. Deductions may be determined as fixed dollar amounts or percentages, or referred to a table for automatic look-up. Tax tables are easily entered, or purchased separately. Prints checks and W2's.

**SET OF FIVE** ..... \$465  
**SET OF FOUR** ..... \$395  
**SET OF THREE** ..... \$325

### RUN ON MOST CPM AND MSDOS

Apple CPM IBM PC XT/AT xAT Zentek xat  
Compaq Apollo xat Sanyo xat  
Compaq Minis xat Terec xat  
Cromem Omega xat Zenith xat & 16  
Epson xat Perseus xat  
Exxon QW 16 Radio Shack CPM Other compatibles

**DEMO DISK**  
**\$18.00**

Try all 5 programs above (GL, AR, AP, IN, FR). Order our DEMO DISK (a \$18.00 cost/each shipping). Condensed versions of the programs give you the "best" of data entry and access. Includes sample reports and instructions. Specify machine.

**TMAN** ..... \$125  
The "Catch-All" program. Files any type of information for quick access. Name or subject oriented with 15 lines of notes per name. Use TMAN as a mailing list, filing system, notebook, etc. Can be used alone or with data from our other programs.

In TMAN DEMO ..... \$18

**HOW TO ORDER:** Please specify machine and disk format. You can pay by check, by VISA or MasterCard (we need your expiration date and card number), or by UPS COD (add \$2.50 COD charge). Our price includes shipping. Minnesota residents, add 6% sales tax. We ship most orders the same day.

or **ORDER BY PHONE: 652-339-2521**

**James River Group**  
CORPORATION



Dept. PC  
125 North First Street  
Minneapolis, MN 55401

(612)339-2521



## QUANTUM LEAP

Although its graphics are more limited than the Amiga's, a monochrome 512K Atari ST with one 3½-inch floppy costs \$800, and a third-party 10-megabyte hard disk costs another \$600, for a total of \$1,400. The Atari 68000 system is significantly faster than an IBM XT but costs about half as much.

There is also no doubt that software is what makes hardware really interesting. In this respect, the IBM PC is leagues ahead of the Amiga and Atari. But that situation could change quickly if a cost-effective way to port Macintosh software to these new computers were developed. If Microsoft puts *Word*, *Chart*, *File*, and *Excell* on either the Amiga or the Atari (or both!) or Lotus ports *Jazz*, many people would have all the software they'd need.

### Wanted: Competition!

IBM has been too successful in expanding its share of the microcomputer market. I am convinced that PC users are best served if IBM has stiff competition. Right now the list seems to be getting shorter almost every week, with COMPAQ being an exception. Apple Computer has been having its share of problems, not the least of which will be competition from the Amiga and Atari. Another company—AT&T—has deep pockets and seems willing to keep trying in the personal computer market until it gets something right.

The market needs more vigorous computer companies to keep options open and prices down. If you don't think competition works, compare the price per megabyte for IBM PC memory with what it costs to expand one of IBM's proprietary systems such as the System 36!

It will be fun to watch Commodore and Atari battle with Apple and IBM in the months ahead. The new Amiga and Atari products are powerful computers at a reasonable price. Judged on technical merit alone, they should be able to give IBM a run for its money. However, both companies face tough obstacles to success, especially in securing adequate distribution. Computer stores will not soon forget the arrogant treatment they received from Commodore and Atari during the heyday of the home computer fad.

The biggest question is whether any new computer that tries to set new hard-

ware and software standards can succeed in the face of IBM's domination of the industry. It's a long shot, but I'm convinced Amiga and Atari have a chance.

Let's hope so. We're all better off if

old-fashioned technical excellence can still compete against slick marketing and high-powered public relations. The personal computer revolution is too young to die—or to be totally dominated by IBM. ■

## Swap diskettes with popular CP/M\* computers!

Just \$69.95 turns one of your PC's floppy drives into a CP/M computer "look-alike" with UniForm-PC.

Imagine a software breakthrough that gives your IBM PC, PC-XT, PC-AT or compatible the ability to directly read, write and format diskettes from most popular CP/M computers—8 or 16 bit! Remarkable UniForm-PC actually reconfigures your floppy drive to emulate the selected CP/M format, allowing your applications programs and utilities to directly access data files that were previously out of reach.

Menu-driven UniForm-PC is easy-to-use and inexpensive. Simply load, select the proper diskette format and go! DOS procedures are unchanged when you use the CP/M diskette. You can even start a project on a PC at work and finish it on a CP/M machine at home without the need for additional hardware or modifications! At just \$69.95, CP/M compatibility never cost so little!

UniForm-PC is available now from your local computer dealer or Micro Solutions.



For CP/M computer owners, UniForm bridges the gap between non-compatible CP/M formats, as well as providing access to MS-DOS™ files. It's also just \$69.95.

Trademarks:  
\*Digital Research  
™Microsoft Corporation

**MicroSolutions**

125 South Fourth St.  
DeKalb, IL 60115  
815/756-3411



CIRCLE 366 ON READER SERVICE CARD

# COMBINE POWER AND ENHANCE YOUR PC-AT

Quadram introduces the smart way to enhance your IBM PC-AT. Quadmeg-AT and Quadport-AT. Smart because Quadmeg-AT and Quadport-AT make the most of your AT system today and expand to meet your system's growing needs in the future.

Quadmeg-AT comes socketed for memory expansion from 128K to 2 Megabytes. Harness this power to create megabyte-sized RAM drives, access

## QUADMEG-AT™



greater amounts of information, and process data faster and more efficiently than ever before. Plus, with "split memory mapping," Quadmeg-AT lets you expand the AT's base system memory to 640K without buying a space-wasting 128K card.

## Advance to 4 Megabytes

When you need more than 2Mbytes, Quadmeg-AT adapts with two Quadmeg-AT Expansion Cards. Each packs 512K or 1Mbyte extra RAM.

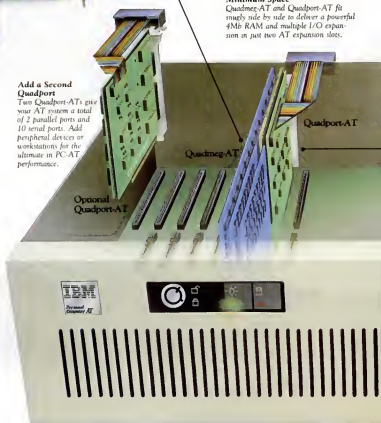
Both cards filled give Quadmeg-AT a powerful 4Mbyte capacity. Quadmeg-AT delivers the power you need to take full advantage of the AT's capabilities.

## Add a Second Quadport

Two Quadport-ATs give your AT system a total of 2 parallel ports and 10 serial ports. Add peripheral devices or workstations for the ultimate in PC-AT performance.

## Maximum Performance in Minimum Space

Quadmeg-AT and Quadport-AT fit snugly side by side to deliver a powerful 4Mb RAM and multiple I/O expansion in just two AT expansion slots.



Look for this seal. It's the mark of dependability and performance from the leader in microcomputer enhancements.

# EXPANDABILITY TO THE SMART WAY.

## QUADPORT-AT™

Quadport-AT combines a parallel printer port and a serial port to give your AT the features found on IBM's Serial/Parallel Adapter. But at a lower cost and with

built-in expandability. Connect printers, plotters, modems, and other devices for increased productivity.

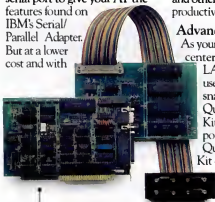
### Advanced Port Expansion

As your AT becomes the center of a high-performance LAN or growing multi-user, multi-tasking system, snap on the optional Quadport-AT Expansion Kit and add 4 more serial ports to your system. The Quadport-AT Expansion Kit comes with software to access these ports, making it easy to add shared peripherals or workstations.

### Enhance the smart way with Quadram.

For basic AT expansion, Quadmeg-AT and Quadport-AT work together to provide 128K memory expansion, a serial port, and a parallel port.

Then, as your system grows, Quadmeg-AT and Quadport-AT give you up to 4MB RAM, 1 parallel port, and up to 5 serial ports in just two PC AT expansion slots. Only Quadram combines so much power and expandability. That's PC AT enhancement the smart way.



### Features

**Quadmeg-AT:** RAM expansion from 128K to 2Mbytes. Expandable in 512K increments. Split memory mapping assigns 128K or 384K to base memory.

**Total RAM Capacity:** 4Mbytes.

**Expansion Cards:** Two cards available. Each comes with 512K or 1Mbyte RAM installed.

**QuadMaster-AT Software:** RAM Drives and Spooling for extended memory.

**Quadport-AT:** Port expansion with 1 Centronics parallel port and 1 RS-232C serial port.

**Quadport-AT Expansion Kit:** (optional) 4 RS-232C serial ports. Software to access ports.

For a free demonstration visit the Quadram dealer nearest you. Or, for information, write us at 4355 International Blvd., Norcross, Georgia 30093 (404) 923-6666.



CIRCLE 407 ON READER SERVICE CARD



# Super Subsystem

## AST's Colossus™—The Complete Data Storage Solution For Unparalleled Performance, Expandability and Reliability

**Unmatched Performance.** Offering the industry's fastest disk access time and disk-to-tape data transfer rate, this 74Mb hard-disk subsystem—expandable to 370Mb—with 60Mb streaming tape backup is perfect for your large single-user data bases, as well as multi-user and local area network applications.



*Rugged, Front to Back. SCSI Expansion Port ensures easy connection to more storage or other SCSI peripheral devices.*

**Advanced Architecture.** Colossus uses state-of-the-art SCSI (Small Computer Systems Interface) architecture and high-performance intelligent peripheral controllers. This means you get automatic media defect management, extensive error identification and recovery, and power-on self-test for total hassle-free operation at all times. With Colossus, "bad sectors" are a thing of the past.

**Features A Future.** Colossus is easily upgraded as your needs increase.

Its SCSI expansion port lets you connect Colossus Expansion Units and other peripheral devices.

**Complete Compatibility.** Colossus is specially designed to be compatible with local area networks, including the latest from AST and IBM® XT/AT compatibility means you can boot directly off Colossus and run PC-DOS and other operating systems. And its exclusive DMA/8/16 AT Interface maximizes performance in multi-user applications.

**Rapid Backup.** Colossus' tape backup allows streaming image or file-by-file backup operations with a choice of menu or command driven software operation. And it's fast—up to 5Mb per minute. Industry standard tape format means media is transportable for access on other systems. Of course, Colossus also provides backup for the XT and AT internal drives.

**Modular Construction.** Pop-in sub-assemblies make enhancement and maintenance literally a snap. We start out with the finest quality components available. Extensive testing and comprehensive burn-in procedures ensure that every completed subsystem will provide you with totally trouble-free performance, no matter what your application.

Your data deserves the best storage system available. For the name of your nearest dealer call our Customer Information Center (714) 863-1333. Or write, AST Research, Inc., 2121 Alton Avenue, Irvine, California 92714 TWX: 753699 ASTR UR.

### Colossus Disk Subsystem Features

- 74Mb Formatted Disk Capacity—Base Unit
- Expands Up to 370Mb Using Expansion Unit(s)
- 30 Millisecond Average Disk Access Time
- Optional Xenix™ Driver (Q4 '85)
- 32-Bit Error Checking and Correction (ECC)
- 60Mb Tape Cartridge Backup—5Mb per Minute Backup/Restore
- Backup/Restore By Drive, Volume, Directory or File
- Local Area Network Compatible
- Boots Off Disk

**AST**  
RESEARCH INC.

Colossus trademark of AST Research, Inc. IBM registered trademark of International Business Machines Corp. Xenix is a trademark of Microsoft Inc.



CIRCLE 102 ON READER SERVICE CARD

# Eavesdropping at the PC Party

The word around town is that America's love affair with the computer is fast growing cold. Rumors of cabling cruelty, printer anguish, and irreconcilable service woes abound.

**T**he honeymoon is over. Nobody's talking divorce, but the romance is definitely on the rocks.

"Damned computer!"

You hear it while waiting in line for the only operable cash machine, which has just handed the latest customer a \$3 bill and shortchanged her 20 bucks. You hear it on the plane, when boarding suddenly halts as two passengers discover they've been assigned the same seat and adamantly refuse to travel in each other's laps. You hear it in the offices of anguished personal computer users who accidentally hold down the Shift key an instant too long and trash a hundred files. You hear it a lot at parties, where revelers who 6 months ago were computer novices, ecstatic about their newfound power, now trade tales of terror.

"Damned computer!"

Nobody is ever going to crown the computer Man of the Year again as *Time* magazine once did. The wonderful little powerhouse that sits on your desk and increases productivity by 20, 50, even a 100 percent has transmogrified itself into a glass-eyed, data-eating demon that's out of style the day after you buy it. The industry seems to think a quick image fix will solve the problem. The industry is wrong.

In their initial excitement, microcomputer pioneers buttonholed friends at parties and regaled them with enough stories about their wonderful machines to put them to sleep standing up. But once those pioneers lived with the machines awhile and discovered their myriad obnoxious habits, the rosy blush of new love turned into the bright crimson of advanced irritation.

Instead of boasting of how they're getting so much more work done that they'll be able to retire at 37, the now-veteran users spread fears that their hard disks may crash, with their careers to follow. The dirty little secrets of the computer



Stephen Manes

world are fast becoming the stuff of party gossip. And potential users, ill-disposed toward computers to begin with, are listening with unmixed glee. Let's grab a seltzer and eavesdrop.

## Getting Cable

"It looks like a school of squid."

Ah, the old cabling bugaboo! By the time you hook up monitor, printer, modem, and a passel of power cords, you've got a good start on a model octopus. Add a second printer, a Bernoulli Box, or, heaven forbid, a network, and your workspace looks like Medusa's hairdo. Persean schemes for cutting through the clutter abound, but none costing less than the computer itself will

ever appear in the pages of *House and Garden*.

That's assuming you can even get the needed cables. Just when things began getting simpler, along came PCjr, Mac, and the AT with brand-new connectors. Oh, for the DEC Rainbow, whose early ads depicted a stylish low-profile monitor and keyboard without even a hint of a wire! Of course, they omitted the exceptionally big and ugly system unit required to make them work.

## Radio Fallout

"No matter what station I tune to, I keep getting WIBM."

It's the latest in heavy silicon, your very own station blithely emitting radio-frequency signals in imitation of and interference with your favorite radio and television channels. There are federal laws about this, but in practice they boil down to a single rule: If your equipment intrudes on the downstairs neighbor's reception of Anacin commercials, it's your headache.

The person your equipment usually bothers, however, is you. Ever since I mated a hard disk to my IBM PC, its unique polyrhythms have accompanied my favorite classical and jazz radio stations. Off-brand equipment is not the sole culprit: A friend's unmodified PC-XT broadcasts every bit as loud and clear as my machine, and IBM's color monitor radiates so much garbage that stacking one on top of a PCjr is verboten.

Diagnosing an interference problem can be maddening. Is it in the printer or the monitor? Is it coming from the unit or a cable? And what do you do when you find out? Well, you could call for help.

**Help? HELP??? Ha!**

This partygoer has come to the sad realization that when it comes to computers, help is generally unavailable. At least the simpler problems already have

solutions, allowing a dealer to occasionally be a hero and make things right. But IBM, Microsoft, and CMI are still playing "musical blame" over the mysteriously undependable AT hard disks. As

for bad chips—well, IBM doesn't consider hundreds of thousands of buggy 8088s anything to get concerned about.

For subtler problems, it's still "Run down to the user group and see if anybody knows." The more obscure aspects of a program may work in ways undreamed of by the manual or the programmers. If you're among the first to venture into such uncharted waters, the salesperson or manufacturer won't come to your rescue as you go under.

**Added Difficulties**

*"It worked fine until I added that enhancer."*

Every personal computer—even a sealed unit like the Macintosh—tends to become a custom model. It's unlikely that anybody else uses the same combination of hardware and software I do.

Peculiar quirks of hardware and software interaction are tremendously difficult to dope out. Users waste hours devising fixes. Then a Hot New Product comes out, and it's back to square one.

**Copy Cats**

*"They made me a criminal."*

That poor soul with the goblet of wormwood recently found out the new upgrade to his favorite program will set him back 20 bucks. It's not the money he objected to, but forking over for a new version just marginally better than the old one (a dozen bug fixes, two new features) after only 6 months. So he swapped disks with a friend who's got the new edition. His clever triumph is mixed with a vague twinge of guilt.

He's not the only one. Users of copy-protected software take to copying programs out of self-preservation. Once the copy-buster's on hand, it's hard to resist the temptation to get more out of it.

**Printer Perplexities**

*"It's like a goat—it's not supposed to eat paper, but it does!"*

Nobody mentions you're going to have to figure a way to route fanfold paper in and out of the printer without causing some sort of massive jam. Nobody mentions you're going to have to figure out the meaning of some mysterious codes called escape sequences in order to

**WHY SETTLE FOR DOT-MATRIX PRINTING?**

*When you can have dot-matrix  
Typesetting!*

DISCOVER  
**LePrint™**

Typesetting for Your Dot-Matrix  
or Laser Printer

**Only \$149**

(includes 5 standard type styles;  
9 additional styles just \$12 each)

Ask your dealer for a LePrint demonstration and copies of our free 8-page brochure and type style catalog. If you prefer, call us toll-free for more information or use your credit card to order direct with our 30-day refund offer.

Call Toll-Free  
**800-LEBAUGH**

(800-532-2844)

In Nebraska 402-733-7600  
Telex 62904952



LeBaugh Software Corp  
2720 Greene Avenue  
Omaha, Nebraska 68147

Copyright © 1985 LeBaugh Software Corp. Ad printed by LePrint. LePrint and LeBaugh are trademarks of LeBaugh Software Corporation. IBM is a registered trademark of International Business Machines Corporation.

**Typesetting!**

*Typesetting!*

TYPESETTING

Typesetting!

**Create professional-looking documents**

Typesetting creates a favorable impression and increases the readability of your material, while capturing attention far better than conventional dot-matrix printing.

LePrint software turns your dot-matrix printer into your own personal typesetting machine, helping you produce better quality ...

reports	brochures	presentations
newsletters	letters	sales proposals
advertisements	manuals	announcements

... almost any kind of document you can imagine.

**Be expressive with our 14 styles!**

With LePrint you have a variety of expressive styles at your fingertips. Only LePrint gives you total control over the character size, you are not limited to one or two fixed sizes. From tiny 1/12th inch to massive full-page letters and anywhere in between, LePrint provides exceptionally clean, crisp characters. Of course you can freely mix styles and sizes within the same document or even on the same line!

- For the IBM® PC and compatible computers
- Supports most popular dot-matrix printers

CIRCLE 302 ON READER SERVICE CARD

tap all the wonderful features the salesman demonstrated. Nobody mentions that threading the ribbon is a pain, that it can jam even when you think it's loaded properly, and that it'll wear out before you can print the word *replacement*. Latent unmentionable: the recent discovery that the output from IBM's Quietwriter models is erasable, thereby facilitating unauthorized creativity on contracts, checks, and the like by their recipients.

Is anybody doing anything to combat these Dirty Little Secrets? I wonder. New users who tote their "all-in-one" Macintoshes home by the built-in handle are shocked to discover they're little more than toys without the outboard disk drive and printer and unsightly cables. Many essential facts about the Mac are utterly ignored by its manuals. And new technologies like networks introduce dozens of "dirty little" of their own. So much for user-friendliness.

Thus dies any flutter of computer romance. For years, people have had a healthy suspicion of computers; after a single hard disk crash, that suspicion is reinforced by bitter personal experience. The machines unromantically remain just that: machines, tools to help get work done.

The word *revolutionary* is in routine use for everything from toothpaste to diapers, but on rare occasions a product can in fact create a social revolution. The automobile and television did; likewise the personal computer.

But the novelty of the product is what creates the romance; once it becomes commonplace, people step back and examine its negatives. The car brought unimaginable mobility; it also brought death and injury on a scale like nothing short of war. Television broadened perspectives in hundreds of ways; it also ushered in a stream of advertising and stupefyingly unoriginal programs.

The computer's current failings will be corrected, or they'll be institutionalized and accepted. Either way, future improvements are likely to be incremental, like color in television. Color is something we can't remember how we got along without, but nonetheless it was an evolutionary, not a revolutionary, change.

So the brief love affair with computers is now over. Final proof? A *PC Magazine* subscription-renewal notice with an envelope that tries to win my sympathy by announcing: "Hello, Mr. Stephen

Manes: I'm Bill Machrone, Editor of *PC Magazine*, and I think computers are boring and stupid." Shaking my head in glum agreement, I realize computers are nobody's darlings now. ■

# Sideline™

**IF YOU BOUGHT SIDEWAYS™, IT'S TIME TO UPGRADE.**

Printing spreadsheets sideways is one of the handiest software tricks to come out of the PC revolution. And Sideways™ is a nice little program. But...

**Sideways™ doesn't** support pathnames, and doesn't let you design your own sideways character font, and doesn't let you store an unlimited number of menu settings, and doesn't let you call menu settings from a command line or batch file, and doesn't give you typewriter output mode.

**Sideline™ does** give you all of these features, plus almost everything else you could ever want in a sideways printing program, and it greatly simplifies page-length and "glue-line" settings. And it's all controlled from a plain-english menu, with a few keystrokes, and all operable via command line from an AUTOEXEC.BAT file. The all-new Sideline includes...

## Sideways printing

- Menu selection of 8 font sizes
- Full 256-character font capability
- One-piece "glued" spreadsheet output
- Character & line spacing control
- Left, top & bottom margin control
- Paper width choice 8" or 15"
- Doublestrike option
- Printer selection from menu
- Menu printer port selection
- Commands independent of Lotus version
- Constant spreadsheet page-length setting
- Requires input of # of rows ONLY
- Avoids user calculation of "glue-lines"

## Sideways custom font design

- Full 256-character font capability
- Graphics mode screen display option
- Single-key current character test print
- Custom font loading from menu
- Unlimited custom font library
- Provides for mouse use in design

## Typewriter mode character sets

- Graphics characters link vertically
- Simulated download, MX, RX, etc

## Pathname support

- Configuration and print files

## Printer format control

- Elite, compressed, enhanced, etc
- Line spacing & right & left margin

## Command line printer setup control

- Autoexec bat file operation
- Unlimited stored settings recall
- Automates routine printing jobs

## Unlimited menu setting store & recall

- Single-key reset to default settings
- Configuration file settings storage

## Special features

- Typewriter output mode
- Printer setup string feature
- Directory default change from menu
- Drive default change from menu
- Single-key sample print routine
- Mouse software interface
- Help screens on all menu pages
- Single menu, all features

The all-new Sideline uses machine-level source code to give you super-fast operation and bring you all of these features and much, much more.

**Don't settle for less.** If you bought Sideways, it's time to upgrade. To Sideline. From Connecticut Software.

For the IBM-PC, PCjr, XT, AT and all compatibles with 128K RAM and one double-sided drive using PC-DOS 2.0, 2.1, 3.0 or equivalent. For the Epson and IBM dot-matrix printers and all compatibles Sideline unprotected \$59.95 VISA, MC or send money order or check. Company purchase orders accepted. Shipping \$4.00 each, COD add \$2.00. Outside USA \$115.00. Dealers welcome. Free info. See your dealer or call direct.

(Sideways is a trademark of Funk Software, Inc. Companions based on Sideways V2.01 purchased 2Apr1985.)

CONNECTICUT SOFTWARE SYSTEMS CORP  
30 WILSON AVENUE  
ROWLAND, CT 06853

## INFORMATION

**203-838-1844**

ORDERS

**800-321-0409**



# Connecticut Software



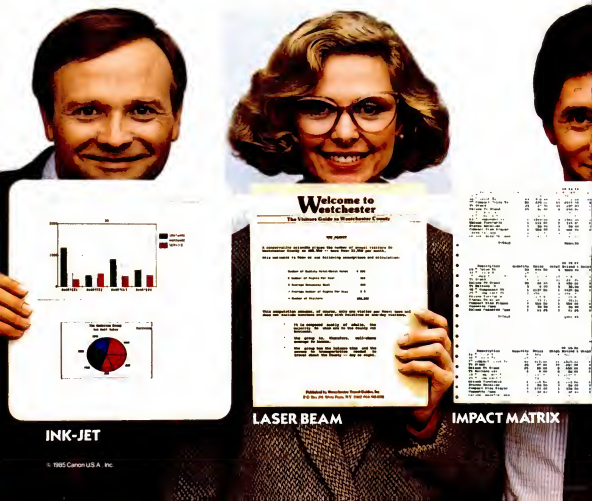
# PRINTOUTS TH

Take a close look at Canon's line of printers. The first thing you'll notice is how good they make you look. That's because Canon's experience in high-tech optics really shows. For instance, Canon was among the first to make a desktop Laser Beam Printer. At a price that's within any business's reach, the Canon Laser Printer can produce eight pages a minute with a quality that's more in common with a professional print shop than a personal computer.

Canon also developed the ingenious Bubble-Jet Printer technology, finally making it possible for a printer to not only work extremely quickly but also incredibly quietly.

Our Ink-Jet Printer can produce exceptionally sharp, high-resolution graphics in seven colors, even on transparencies. While the Thermal Transfer Printer has three kinds of print modes, including letter quality, at a very competitive price.

And the Canon Impact Matrix Series, for regular and extra-wide column paper, makes printing very fast, very economical.



**INK-JET**

**LASER BEAM**

**IMPACT MATRIX**

# AT STAND OUT.

Visit your local computer store and judge the complete line of Canon printers firsthand.

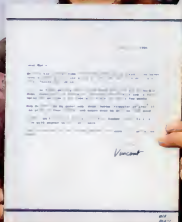
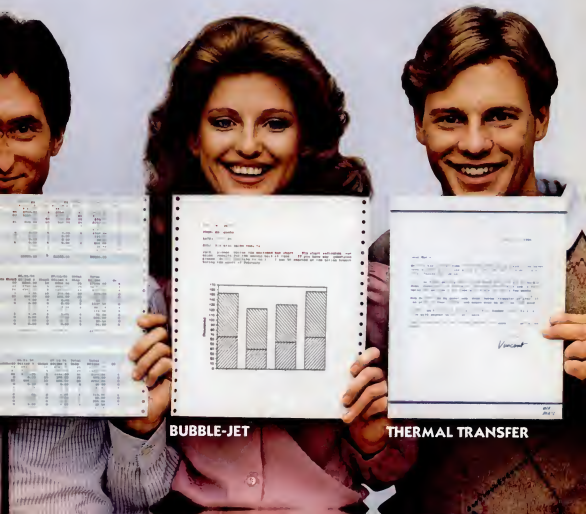
You'll find the print quality is absolutely crisp. The graphics are remarkably clean. And the reasons for buying one are perfectly clear.

For more information, call 1-800-323-1717, ext. 300 (in Illinois, 1-800-942-8881, ext. 300). Or write Canon U.S.A., Inc., Printer Division, P.O. Box CN 11250, Trenton, NJ 08650.

**Canon**  
PRINTERS



CIRCLE 213 ON READER SERVICE CARD

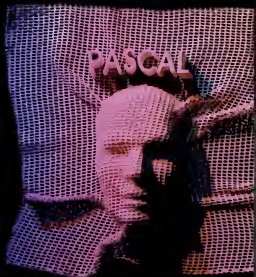


**BUBBLE-JET**

**THERMAL TRANSFER**

COVER STORY • JOHN DICKINSON

# PROGRAMMING MAKES SENSE FOR BUSINESS





**You may not be a professional programmer, but you spend a lot of time programming your PC—for practical reasons and for fun. But do you use the right language products? Should you change? Here's help in deciding.**

**P**C Magazine's reader surveys tell us that over 60 percent of you are programming your own PCs these days. The overflowing mailbox backs up this statistic daily with letters requesting more programming and technical columns. And our Interactive Reader Service bulletin board is kept so busy sending you source code for our published programs that we're not sure our expansion plans for it are ambitious enough.

Those same surveys say that only 4 percent of you are professional programmers, so the obvious question is, Why are so many of you programming your own PCs? With thousands of commercially available software packages that let you do everything from simple typing to professional word processing, and from financial analysis to grocery-coupon analysis, why do you choose to put up with the vagaries of a cryptic, arcane computer language to make your computer do something for you? Why are you learning new languages and complex techniques that were, until recently, solely the domain of professional programmers? Why don't you just buy a package that already does what you want your program to do?

Several good reasons come to mind. One major reason is that no prepackaged commercial program, including the PC's own DOS, can satisfy all of you in all ways at all times. You always have one more thing you want it to do or one more way you want to do it. But with so many of you using their products, the commercial software vendors simply can't keep up with your demands, so you "roll your own," and write a program to do the job.

Another reason to program your PC is

to build bridges that transport data between the various software packages and hardware products that you regularly use but that don't get along with each other well enough to communicate effectively. We know because you regularly fill our User-to-User, Power User, and Spreadsheet Clinic coffers with tips on how to transfer those awkwardly formatted *WordStar* files to other programs or use printers in some way that *1-2-3* or *Microsoft Word* don't know about.

## The Game

But perhaps the most compelling reason of all is that you enjoy the challenge of programming your machine and the sheer joy of winning the "game." The visceral experience of computer programming closely resembles that of competitive sports or, more realistically, a good stiff game of point-ante poker or *Trivial Pursuit*.

Unlike many things that challenge you in life, computer programming is a game that can be won, lost, and won again without damage to your ego or physical abilities. It's not unusual for a PC user to spend all night getting a program to work right and then, without a second thought, spend the next night meeting the programming challenge all over again by adding features to it. The only real damage may show up in a divorce court, but it's difficult to imagine a judge granting separation papers on grounds of "cruel and unusual programming."

No matter what problem you're trying to solve, programming a PC is safe, rewarding, and fun—that's all there is to it.

But is it easy? Programming a PC may seem difficult the first time you try it, but in the long run it is easier, and infinitely more satisfying, than programming a typical microwave oven. How easy it is depends on what type of program you're trying to write and what language you've chosen to write it in—and those issues are not unrelated.

## A Marvelous Continuity

An interesting thing about computer languages is that they tend to survive longer than the computers they were designed for. When you look at the history of lan-

guages in contrast to the history of computer hardware, there is a marvelous continuity rivaled only by the history of human languages.

That continuity is partly fallout from the fact that hardware development has advanced at a much faster pace than software development. But it is more significantly the result of a good business decision that dictates a stable human environment for using and programming computers. Corporate America has a seemingly insatiable need for better, faster computers of all classes from micros to mainframes, and it would be a financial and human disaster if every business application had to be re-

**I t's not unusual  
for a PC  
programmer to spend  
all night getting a  
program to work  
right and then,  
without a second  
thought, spend the  
next night adding  
features to it.**

written at the rate new hardware is usually introduced.

## Roots

Just as history and geography are filled with a variety of human tongues, computerdom is filled with a variety of languages. Each computer language has its history, purpose, and place, and all have proponents who are willing to challenge would-be interlopers on either technical or purely emotional grounds.

Computers were around long before programming languages, but not before people had to program them. The first computers had to be programmed by flipping switches and wiring "bread boards" that connected various instructions and locations of the computer. When computer

memory was invented, programs could finally be stored inside the computer, but the only way to write programs was in binary and, later on, hexadecimal or octal codes. It was difficult, but it beat switching and wiring by a country mile.

Programmers finally wrote themselves a program that translated short computer instruction mnemonics into the computer's binary codes. It was called an "assembler" because each mnemonic was assembled directly into one computer instruction. Later enhancements included symbolic (named) variables, which replaced direct memory references with simple names. These improvements made programming enormously easier. The gods of computing looked at assemblers and declared that they were good.

## But Not Easy Enough

Forward-thinking programmers were still not satisfied, however. A few years later, higher-level computer languages were designed that allowed a programmer to think directly about the problem at hand rather than about how to instruct the computer to solve it. The resulting program ran more slowly than one written in assembly language but took so much less time to develop that the performance penalty was well worth it.

The first such language was FORTRAN (FORmula TRANslation), which was designed to solve scientific and mathematical problems. The next was COBOL (Common Business Oriented Language), which was designed to handle large-scale accounting and recordkeeping problems.

Both FORTRAN and COBOL, originally developed by IBM, have survived for nearly 30 years in the fast-changing computer market and are available today for your PC. But they have not survived without serious attacks. One offensive came from people who challenged the strategy of program development itself.

FORTRAN and COBOL, and most computer languages in use today, are known as compilers. Compilers use a multistep process to translate source language statements entered by the programmer into machine language. First the code is entered, then it is compiled, and after an intermediate step called link editing, it is

# BENCHMARKING THE LANGUAGES

**For PC Magazine's programming language roundup, our reviewers tested each product against a series of six benchmark tests. Here's a description of each.**

A benchmark is a standard against which you can measure or judge something. Since each computer language has its own strengths and weaknesses, no single, global measurement will do the job. And time flies so fast in a computer that you can't just measure something once—you have to measure it thousands of times.

The language benchmarks used here are the same ones used in *PC Magazine's* last language roundup (Volume 2 Number 4). Rather than attempt global measurements of language performance, these benchmarks demonstrate each language's ability and speed in handling six simple tasks that are usually repeated millions of times when a typical computer program is run. You'll find the execution speeds for each version of each language in the performance table accompanying each language article.

If you are selecting a language, how hard it is to program the benchmark test may be more important to you than how fast it runs. Because it is your time, not your computer's, that is spent learning the language and writing programs with it, succinct code should be important to you. We've listed the source code of each test for the editor's choice product in all five languages (except for the floating-point test in assembler).

## The Empty Loop

Doing anything only once with a computer program is almost not worth doing at all. The reason is that most programs spend most of their time looping through a sequence of instructions (iterating). The "empty loop" benchmark, which does nothing 10,000 times, is

meant to show how well and quickly each language controls the iteration process.

## Integer Addition

After looping, adding a series of integer numbers together is the most frequent function in computer programs. While integer addition is often the sole purpose of a program loop, a series of integer additions more often controls exit and entry conditions for a series of loops. In short, it is an important application of a com-

---

**I**n a computer, you can't just measure something once—you have to measure it thousands of times.

---

puter language, and *PC Magazine's* benchmark is designed to demonstrate each language's integer addition skills.

## Floating-Point Arithmetic

Floating-point arithmetic is a difficult test for a PC's programming language because, unlike integer arithmetic, the PC's 8088 CPU does not know how to do it. The language product designer's skills come into play here more than in any other benchmark because the design of the floating-point emulation technique directly determines its performance. If you have a mathematical, scientific, or finan-

cial application in mind, the floating-point benchmark should be critical to you when you select both a language and a product.

## Character String Concatenation

Character manipulation is obviously important for word and other text-processing applications, but it also has wide applicability in general-purpose computer memory management. Other string operations can be good determinants of a language's string-handling skills, but concatenation is by far the most commonly used. While the time results are interesting, you may be more fascinated by the variety of language designs for the simple task of pasting two sentences together.

## Table Lookup

Storing a series of numbers in a table and then later looking for them is a very common function in computer programs. Languages vary greatly in how they handle the problem; the benchmark speeds as well as the source code styles vary significantly. The reason is that some languages (called "strongly typed") are more concerned about numeric types; they have more rules about using them and converting them to other numeric types than do weakly typed languages, which play fast and loose with numbers.

## File Access

Reading and writing data from disks is obviously critical to any good PC application. How fast each language does it is probably not too important, however, because they invariably use DOS function calls to handle the boring chores of manipulating the disk drive. We tried to make the test a bit unfair to both DOS and the languages by using 132-byte records, which is absolutely not an optimum or standard size and forces either the language or DOS to do extra work. Once again, it's probably more important to consider how fast you'll be able to write a program in a given language to manipulate files than how fast the language actually handles them.—John Dickinson

run. If the results are wrong, the errant source statement (or statements) has to be corrected, and then, compiled, linked, and run again.

### Subject to Interpretation

Compilers are relatively efficient at their job of composing computer programs, but inefficient when it comes to making the best use of today's most precious computer resource: a programmer's time. Compilers are particularly inefficient tools for program development when the programmer is new to the game and trying to learn. To improve the odds in the programmer's favor, two Dartmouth College professors, John Kemeny and Thomas Kurtz, and an IBM employee named Kenneth Iverson, developed alternatives to compiled languages known as interpreted languages—Kemeny and Kurtz's creation was BASIC (Beginner's All-purpose Symbolic Instruction Code) devised in 1964, and Iverson's was APL (A Programming Language), created in 1962.

An interpreter looks at each source statement and then immediately composes a binary computer program to execute the task. The nature of interpreting makes an interpreted-language program slower to run than a compiled one. But the interpreter's ability to enable you to interactively enter a program, run it and see the results, then modify the program and run it again without stopping to compile and link edit each time, makes interpreters attractive and quick as learning and program-development tools. Like FORTRAN and COBOL, BASIC and APL are long-haul survivors and can be used today on a PC.

### Structure

A more recent trend is to write programs that follow a somewhat vague set of concepts and rules that has become known in the trade as "structured programming." Structured programming, which has evolved almost into an art form all its own, results in programs that are simple, often elegant, statements of both the problem and the solution, which makes them a great deal easier to develop and infinitely easier to maintain than unstructured programs. The concepts may be vague, but the benefits of the structured approach are

appreciated in the commercial programming community, where it is generally accepted that structured programming makes better use of a programmer's time.

While some structuring of programs can be done in any language, several languages have emerged in recent years that are specifically designed to produce well-structured programs. They almost force you to use the tools of program structuring, which include functions, subroutines, and other program block structures, and data structures (also called records or sets) that allow meaningful names to be used for memory locations. These languages include Europe's Algol, which never caught

---

**S**tructured programs, which are simple, often elegant, statements of both the problem and the solution, are infinitely easier to maintain than unstructured programs.

---

on in this country, IBM's PL/I, and, more recently, Knuth's Pascal and Bell Laboratories' C.

### You Are What You Program In

A gaggle of languages are available for your PC, but you use only a few of them widely. For this issue, *PC Magazine's* editors have selected only the most significant ones and have asked reviewers to evaluate representative products that assemble, compile, or interpret each selected language. We couldn't review the entire range of products available for each language, so we've tried instead to give you some insights into the products that are at the top of their category, along with those that offer the most flexible programming environments for your PC.

Here then are the languages covered in this issue, ranked according to what percentage of *PC Magazine* readers who program use them.

### BASIC

It's no big surprise to us that most of you (87 percent of our programming readers) use BASIC for programming your PCs, even if you use other languages as well. Microsoft's by-now-legendary BASIC interpreter comes installed in an IBM PC's ROM chips and comes on disk with the operating system for most compatibles. In either case, it's free for the asking—all you have to do is boot it up and start coding in BASIC (you don't even need to have a disk installed on an IBM PC, although it's preferable).

Perhaps in trying to explain the language's popularity, it's more important to note that BASIC is marvelously easy to use and one of the most powerful languages available for the PC when it comes to using your computer's resources, especially screen formatting and graphics. Most other languages require you to buy additional library routines or write your own assembly language programs to get the sort of full-screen user interfaces you're used to from professionally written programs.

BASIC is an interpreter, so it's relatively slow. But BASIC's interactive, interpretive environment does just what its original developers, Kemeny and Kurtz, wanted—it gives you a place where it's easy to learn how to write, run, and debug a computer program. You can apply many of those lessons to more-advanced, faster languages, or you can buy a BASIC compiler to make the programs you debugged using the interpreter run faster. The choice is up to you, and perhaps this issue of *PC Magazine* will help you decide.

### 8086/8 Assembly Language

It is something of a surprise that so many of you (38 percent of readers who program) program in assembly language. No language is more arcane or difficult to learn and use; the Intel version's mnemonics and memory formats for the 8086/8 and DOS's program interface are no joys.

But after we reread our mail, we began



# THE AUTHORS

**A who's who of PC Magazine's language reviewers plus some personal insights into their specialty areas.**

To bring you the latest word on PC programming languages, *PC Magazine* naturally sought out an expert for each language. Each of our experts is highly qualified and has his own strong opinions on that language. Here's some background on each author along with his comments on his language of choice.



**Eric Bank** teamed up with *PC Magazine* associate editor Stephanie Stallings to review COBOL. Bank, an independent consultant who specializes in designing COBOL-based business applications, learned COBOL as a student while working his way through college as a data processor. He has continued to expand his fluency in the language throughout the past 12 years. While he programs in other languages as well, Bank thinks COBOL is the ultimate business language because "it is quick, easy to learn and to read, and handles large data files with precision." Bank has recently been experimenting with programs that extend COBOL beyond purely business applications, including one that uses a complex algorithm to plot graphs of imaginary number sets.



**Jeff Duntmann** is technical editor for *PC Tech Journal* and author of *The Complete Guide to Turbo Pascal* (Scott, Foresman, 1985), which he describes as "the first book written specifically for Turbo Pascal." He learned Pascal in 1979 and immediately fell in love with the language for its elegance, readability,

and modular structuring, which has allowed him to stockpile a considerable library of useful subroutines. In fact, one of the reasons he continues in his commitment to Pascal is his time investment in these subroutines. "In Pascal," he says, "I can write a piece of code, pick it up a year from now, and know at a glance what it does." Duntmann also favors Pascal because of its "generalist" orientation. "I expect my programming language to follow me into anything I want to explore," he says. True to his word, Duntmann has written Pascal programs that run stepper motors, plot star charts (look for a public-domain program called KEPLER), and keep addresses, as well as countless other utilities and short applications.



**Kaare Christian** puts together computer systems for vision research at the neurobiology lab of New York City's Rockefeller University. He is also the author of *The Unix Operating System* (John Wiley, 1983) and a soon-to-be-released book on the Modula 2 programming language. Christian initially learned C in 1976 while programming graphics and UNIX applications at the New York Institute of Technology. He continues to use C today primarily because it is extremely portable. His work often involves hooking up exotic hardware systems, and he says C is "one thread that runs through all systems." He also favors C because of the direct control it gives the programmer. "Programming in C is like driving a sports car," says Christian. "Everything is manual and rudimentary, but control is extreme."



**Richard Aarons** is a contributing editor of *PC Magazine* and a senior editor at *Business and Commercial Aviation* magazine, specializing in aviation-related software. He is also president of RNA Associates, a Connecticut-based firm that develops law-enforcement applications (almost exclusively in BASIC). He has been a BASIC programmer for 8 years, starting out on a Radio Shack Model I in the days when if you wanted software for your microcomputer, BASIC was your only option.

Aarons believes that BASIC's popularity, its ability to access machine-specific functions, and its ongoing evolution into the modular structures popularized by C and Pascal make it truly the language of the future. He describes BASIC as the language for "the guys in the trenches. I've tried to move into the fancier languages, but when you gotta make a buck and the deadline's coming, you do it in BASIC."



**Charles Petzold** is a programmer and freelance writer. *PC Magazine* readers know him as the PC Tutor editor and as a Programming column author and frequent editor of the Power User column. He found his way into assembly language programming in 1979 when he built and programmed a computer-controlled music synthesizer around a Z-80 microprocessor. In his former post as office-automation coordinator with New York Life, he wrote lengthy mainframe assembly language programs to calculate premium payments quickly from personal data variables, but he now uses assembly language mostly to create utility software for the IBM PC. Why does Petzold program in what he admits is the most difficult language to master? "Power," he replies. "You can do the most with it, and virtually anything you write will execute very quickly." —Paul M. Stafford

to understand. Assembly language is in some ways the only suitable alternative to BASIC for getting the most programming bang for the buck out of your PC. Most of the compilers available don't get you to as many PC resources as easily as the assembly language (or BASIC) can. If something can't be done using the PC's assembly language, it can't be done at all, and many of you have discovered how great that can be when writing your own programs.

Assembly language programming is arduous and slow work, but the programs are incredibly fast when they're finally running, and in terms of performance and your own sense of achievement, the end result is particularly gratifying. In fact, it's more like winning a high-stakes poker game in Las Vegas than a penny-ante one in the den. If you haven't tried assembly language programming, give it a whirl—you might just fall in love.

## Pascal

Pascal's popularity (used by 30 percent of our programming readers) came as no surprise to *PC Magazine's* editors. It would have 2 years ago, but since then, Borland International invaded the languages market with a \$69.95 high-performance, RAM-resident compiler called Turbo Pascal that changed the language's image forever.

Pascal was invented in 1971 by Niklaus Wirth, the Swedish computer science professor who, like Kemeny and Kurtz, wanted to make learning how to program easier. He differed from his predecessors, however, in that he wanted to make it easier to learn how to write well-structured programs. As a result, Pascal (named for the 17th-century French mathematician and philosopher, Blaise Pascal) was designed to force good structure on programmers using the language.

It has succeeded quite well as a teaching language, but some of Pascal's limitations have led to serious problems when it has been used in the business world. Like most block-structured languages, Pascal's formal definition is limited to a kernel of fundamental instructions. This restriction isn't serious in an academic environment, but business applications require a richer

variety of language facilities. When adding extensions, implementers of Pascal compilers have gone their separate ways, and the result is a hodgepodge of incompatible Pascals.

The compatibility problem had made Pascal less than suitable for business applications because transporting a program between machines with different Pascal compilers was next to impossible. Then Borland stepped in by making its inexpensive, fast compiler available on a number of micros besides the PC.

Since you're a PC user, you get the benefit of a standardized compiler for a terrific language. With any luck at all, Borland's

**The oldest business programming language survives not because it is such a great language, but because the installed base of applications written in COBOL is so large.**

standard will become even more accepted on a wider variety of computers.

## C

Looking at C (used by 21 percent of our programming readers) source code might make you think its name stands for "compact" because it's such an economical, yet powerful and well-structured language. I'm sorry to have to tell you the very unromantic story of its name: C is the next letter in the alphabet after B, and B was C's predecessor as Bell Laboratories' internal systems-development language.

C was developed by Brian W. Kernighan and Dennis M. Ritchie as a systems programming language for the UNIX operating system. It is a block-structured language that contains some of the best fea-

tures from other languages, including PL/I, Algol, and Pascal. UNIX itself was originally written in C for DEC PDP-11 minicomputers. Several variations of both C and UNIX are around for many computers, including the PC, but Bell Laboratories and AT&T have made substantial efforts to maintain standards for them.

C is fast becoming the language of choice among professional applications and systems developers for the PC, other micros, and most classes of computers. A fifth of you are already using it, and I suspect that number will grow in the next year or two because C's general portability, simplicity, and power can only increase its popularity.

## COBOL

This statistic may come as a shock to you, but the majority of all currently operating computer programs (about 80 percent) are written in COBOL (which is used by 8 percent of our readers who program). The oldest business language survives not because it's a great language (although plenty of programmers love it), but because the installed base of COBOL applications is so large. Rewriting those programs would be uneconomical; a large base of COBOL programmers is needed to maintain them. Those same programmers usually favor COBOL when they develop new applications.

You probably don't use COBOL because it's best suited to applications that don't usually run on PCs, or at least not ones that you write for yourselves. COBOL does the mundane chores of accounting and recordkeeping better than just about any language invented before or since. Many computer scientists would like to see it replaced with something more in line with today's philosophies of program design and structure. Many have even tried to replace COBOL, but they have all failed because COBOL is a survivor in the world of business computing. If you want to write accounting programs for your PC, COBOL may be your language of choice. ■

*John Dickinson was recently appointed special projects editor of PC Magazine. He has programmed in over 20 languages.*



# 26 reasons to subscribe to PC Magazine

You'll get 26 big issues a year of the most up-to-date news and technological breakthroughs affecting you and how you use your IBM PC—at unbelievable savings!

You'll build a professional library of insights, written by leading experts and professionals in personal computing covering the newest releases in hardware and peripherals—timely innovations in programming and applications—feedback from professionals and users like yourself on how they use their PCs to increase their productivity—and up-to-the-minute reviews of the newest releases in software.

Subscribe to *PC Magazine* for less than 85¢ an issue, only \$21.97 for 26 issues and save 37% off the regular one-year rate.

Use the attached Order Card or call Toll Free

**1-800-852-5200**

# BASIC



## BASIC: If it can be done, BASIC can do it, and what's more, there's a BASIC for everyone. One user makes a strong case for the world's most widely used computer language and looks at some of the current crop.

**Y**ears ago, a friend of mine returned home from two stints as a chopper pilot in Vietnam. He spent a month "getting civilized" and then went around to the airlines looking for a job.

Shortly thereafter, I ran into him at a local watering hole. He was more down than I'd ever seen him. "What's wrong?" I asked.

"Well," he sighed, "I thought 2,000 hours flying experience was more than enough to get an airline job, but it turns out that having helicopter time in your logbook is like having a social disease in your medical records." Airline people apparently don't believe helicopters are *real* aircraft.

A similar situation exists with programming languages. Veteran data processing types just don't believe that BASIC is a *real* computer language.

In fact, even among hobbyists, it's getting so that "if you don't speak 'C' you ain't a real man—or woman." The implication here is that BASIC programmers eat spinach quiche, own small, yippy dogs, and suffer many nonspecific disorders of the psyche.

Well, at the risk of losing credibility with my friends and readers in the microcomputing world, I'll admit it right here: I program in BASIC.

Let me tell you why.

When microcomputers first came along, the only language you could program in was BASIC—good old linear, two-character-variable, everything's-double-precision BASIC. Of course, you could have programmed in assembly or machine language—and some did. But the few that chose those roads either went crazy or invented software like *VisiCalc*. In either event, no one ever whipped up a workable user application in a day or two in hopes of scratching out a living.

It is true that BASIC hasn't been very pretty in the classical programming sense until recently. But it's just as true that until

recently BASIC was the only high-level language that could get a desktop computer to exercise all of the machine's capabilities. That's simply because each machine had its own custom-made BASIC to optimize its features.

True, customizing the language did lead to portability problems. But what good is a highly portable language that can't begin to touch the special features offered by the various hardware vendors? If



*To us, Summit Software Technology's Better-BASIC system stands out from the crowd because it combines the best elements of interpreters, compilers, and language structures in a single environment for the programmer of typical talents. Its authors have taken those extra steps to make the language usable in day-to-day programming tasks—such as including an interface with the well-known Btrieve/ISAM utility.*

all the industry wants is portability, it might as well develop one bland machine with one beautifully structured programming language and call it quits.

So, much to its credit, BASIC is a high-level language that can do all sorts of low-level things on its host machine.

### Four BASIC Flavors

Some new versions of BASIC can run much more quickly than the original interpreted versions while retaining the language's interactive qualities. In fact, BASIC now comes in four different flavors: the traditional interpreted and compiled/linked versions, plus two hybrids. One of these hybrid forms, represented by Better-BASIC, is what I call an "interactive compiler." As with an interpreted language, you enter all your source code and run it from within the language's own internal

editor, and you can get an almost immediate response to your program upon typing RUN. But an interactive compiler runs that code much faster than an interpreter: It compiles your code into memory rather than interpreting it a line at a time or compiling it from DOS in the traditional compiler fashion. However, like a traditional compiler, an interactive compiler can generate .EXE and .COM files.

The other hybrid, represented here by True BASIC, performs as a traditional interpreted language. But you can also ask it to "compile" pseudocode, which in theory makes your program portable to any machine that supports the language.

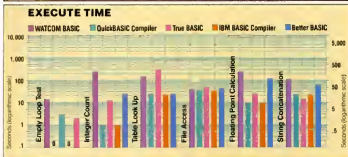
And it's also become pretty. Many of these new interpreters and compilers now qualify as fully structured languages. In fact, you can now write a complicated BASIC application without ever saying GOTO or GOSUB. The pretty BASIC has multiline functions, procedures with arguments both local and global, and nifty structures like DO...UNTIL and CASE...ENDCASE. It even has b-trees and ISAM support, both integrated and offered by outside vendors such as SoftCraft and Computer Control Systems, as well as fancy screen generators like *Screen Sculptor* from The Software Bottling Company of Maspeth, New York.

In short, BASIC programmers now have all the goodies that those who program in other languages have. In addition, they have, for the most part, the good old comfortable keywords and syntax they learned years ago.

Sure, Turbo Pascal is pretty and it generates nifty code in an interactive compiler environment. But so does BetterBASIC, and you can bet Microsoft isn't too far away from releasing a low-cost, interactive compiler BASIC.

So why bother putting a semicolon after each line and driving yourself nuts with nested BEGIN...END blocks? If it can be done, BASIC can do it. In fact, the only

## BASIC



**FILE SIZE (in bytes)**

Program	WATCOM BASIC	QuickBASIC Compiler	True BASIC	IBM BASIC Compiler	Better BASIC
Empty Loop Test	21,744	n/a	23,174	45,616	n/a
Integer Count	21,744	n/a	23,174	45,616	n/a
Table Look Up	22,096	n/a	23,526	45,904	n/a
File Access	26,212	n/a	27,690	49,584	n/a
Floating Point Calculation	21,840	n/a	23,270	45,696	n/a
String Concatenation	21,856	n/a	23,286	45,728	n/a

**COMPILE TIME (in seconds)**

Program	WATCOM BASIC	QuickBASIC Compiler	True BASIC	IBM BASIC Compiler	Better BASIC
Empty Loop Test	99	n/a	99	n/a	n/a
Integer Count	99	n/a	99	n/a	n/a
Table Look Up	99	n/a	99	n/a	n/a
File Access	99	n/a	99	n/a	n/a
Floating Point Calculation	99	n/a	99	n/a	n/a
String Concatenation	99	n/a	99	n/a	n/a

Benchmark test results for WATCOM BASIC, Microsoft QuickBASIC Compiler, True BASIC, IBM BASIC Compiler, and BetterBASIC. All tests were run on an IBM PC with two floppy disk drives. All file sizes are listed in bytes, all times listed in seconds. Note: True BASIC and WATCOM BASIC are interpreters and thus do not produce object code or have compile times. BetterBASIC compiles in the interpreter, so compile times are instantaneous. Compile times for Microsoft QuickBASIC and IBM BASIC were 2 seconds for each test. Times shown include standard link time of 97 seconds. BetterBASIC, Microsoft QuickBASIC, and IBM BASIC also compile run-time object code that can be executed only with additional run-time modules. File sizes for run-time code and modules are not listed here.

problem BASIC programmers have today (besides admitting they're BASIC programmers) is picking the appropriate BASIC for their applications.

My guess is that Microsoft BASICs (including the Microsoft-authored IBM BASICs) will always be around in steadily improving versions. BetterBASIC, a relative newcomer, shows what is possible with a fully structured language in an interactive compiler environment. MTBASIC (not reviewed here) is a highly specialized BASIC for those interested in asynchronous multitasking on a single-processor CPU. True BASIC, offered by the original au-

thors of this language, attempts to bring some degree of standardization to the language in its ANSI (draft) garb. WATCOM BASIC is a language designed to be used in a multisystem environment where applications must be moved from machine to machine, vendor to vendor.

In short, there is a BASIC for everyone, somewhere.

My advice to my fellow "closet" BASIC programmers is to take heart. Don't be afraid to speak up for your language. You can do all the things the big boys can do, and you can often do it faster, cleaner, and better.

## BetterBASIC

BetterBASIC may be the best of all BASIC programming worlds. It combines all the best features of other microcomputer BASIC environments.

However, it seems that designing modern interactive compilers is an art of compromise. The cost of a marvelous programming environment with BetterBASIC is relatively fat code. For example, our simple table-lookup benchmark requires 45,904 bytes as a standalone, BetterBASIC .EXE program.

The same source code compiled with Microsoft's QuickBASIC compiler generates a standalone .EXE program that comprises 22,096 bytes. Interestingly enough, the BetterBASIC file completes the table benchmark test in 88 percent of the time required by the QuickBASIC version. It would seem, then, that BetterBASIC is like a small college fullback—fat and fast.

The BetterBASIC interactive compiler environment does offer some delights, though. First, it is syntactically identical to the later versions of Microsoft BASIC. Admittedly, Microsoft BASIC may not be the best in the world, but it is the BASIC that most of you cut your teeth on and continue to use today under the guise of the various PC BASICs. In addition, BetterBASIC supports structured programming with strong subprograms and user-defined, multiline functions. It also lets you create your own libraries of functions and subroutines. Support is available for the 8087 math coprocessor (as well as the 80287), and a run-time module lets the user generate standalone .EXE-type programs. The program also supports chaining and uses all available memory.

One of the best features of BetterBASIC is its interactive programming environment. It works like this: You call up BetterBASIC just as you would any interpreter BASIC, and it comes up with its own screen that is very similar to the PC BASIC screen. Here you begin to write your main program in the traditional way, using line numbers. At any point, you can type procedure (name) or function (name). The screen will then change to a new work space that belongs to the procedure or function. Here you write the function as a



standalone BASIC program with line numbers. (You needn't worry about conflicts with line numbers or variables in other sections of the program; everything is local unless defined as an argument or argument variable for passing data among the routines.)

You can use Microsoft-type declarations such as (\$) for string, (#) for double precision, a Pascal-type declaration system such as REAL: A,B,C; STRING: X[89], and so forth.

Such user-defined structures as records and sets are also supported as well as simple assembly language interfaces, win-

dows, and graphics. Although you use line numbers, a BetterBASIC program can be totally structured.

One way to think of BetterBASIC is as Pascal using Microsoft BASIC keywords, commands, and built-in functions and procedures.

As your program develops with each function and procedure in its own work space, debugging is ongoing and fully interactive. Everything must work together as the program is built up.

You can save all of the procedures and functions (or a subset of them) into a library for use in other programs. Thus you can add permanent elements to the language.

The program offers full support for windows and graphics as well as the usual Microsoft file types. Full support for Soft-Craft Inc.'s *Btrieve*, the popular independent b-tree, ISAM file management system, is available as an option.

Unwilling to trust my own judgment, I asked two other language reviewers what they thought of BetterBASIC. The vote was unanimous: BetterBASIC is the best if you can put up with fat code. So good, in fact, that other language purveyors, most probably Borland and Microsoft, are expected to bring out similar products by year's end.

BetterBASIC is available on a modular basis, so you have the option of purchasing only what you need. The BASIC programming system costs \$199. The 8087 support module costs \$99. Add \$49 for binary math support, \$99 for *Btrieve* support, and \$250 for a run-time converter, and you've got the works.

### IBM BASIC Compiler and Microsoft QuickBASIC Compiler

Microsoft probably knows more about microcomputer BASIC than any other company. In 1975, Microsoft developed a BASIC interpreter for the MITS Altair, and it's been supplying increasingly more-advanced interpreter BASICs for microcomputers ever since. In fact, 9 out of 10 microcomputers use some version of Microsoft BASIC, with over 3.5 million users worldwide.

The three versions of IBM interpreter

```
SOURCE
PROC=0
INTEGER: X,L
STRING: STARTS[8],STOPS[8]
INTEGRAL ARRAY (25): A
1 'Table lookup test
7 STARTS= TIMES
10 FOR X = 1 TO 1000
15 RESTORE
20 FOR L = 0 TO 24
30 READ A(L)
40 NEXT L
50 NEXT X
60 STOPS=TIMES:PRINT STARTS,STOPS
200 DATA 1,2,3,4,5
210 DATA 6,7,8,9,10
220 DATA 11,12,13,14,15
230 DATA 16,17,18,19,20
240 DATA 21,22,23,24,25
250 END
ENDFILE
```

BetterBASIC: Table lookup test.

```
SOURCE
PROC=0
INTEGER: X
STRING: STARTS[16],STOPS[16]
1 'Empty loop in BASIC
2 LET STARTS= TIMES
30 FOR X = 1 TO 10000
40 NEXT X
45 STOPS= TIMES
50 PRINT STARTS,STOPS
60 PRINT "START"," STOP"
ENDFILE
```

BetterBASIC: Empty loop test.

```
SOURCE
PROC=0
INTEGER: X
STRING: STARTS[8],STOPS[8]
REAL: A,B,C
1 'Floating Point
7 STARTS= TIMES
10 FOR X = 1 TO 10000
20 A=B: B=1234.56: C=78.9
30 A=B/C
40 A=B/C
50 NEXT X
55 STOPS= TIMES
60 PRINT STARTS,STOPS
ENDFILE
```

BetterBASIC: Floating point test.

### PC FACT FILE



**BetterBASIC**  
Summit Software  
Technology Inc.  
40 Grove Street  
Wellesley, MA 02181  
(617) 235-0729  
**List Price:** \$199; 8087  
support module, \$99; binary  
math support, \$49; *Btrieve*,  
\$99; run-time converter, \$250

**Requires:** 192K RAM, one disk drive, DOS 1.1 or later.

CIRCLE 686 ON READER SERVICE CARD



**QuickBASIC Compiler**  
Microsoft Corp.  
10700 Northup Way  
Bellevue, WA 98009  
(206) 828-8080  
**List Price:** \$99  
**Requires:** 128K RAM,  
one disk drive, DOS 2.x.

CIRCLE 685 ON READER SERVICE CARD



**BASIC Compiler**  
IBM Entry Systems  
5201 South Congress Ave.  
Boca Raton, FL 33431  
(305) 998-2000  
**List Price:** \$495  
**Requires:** 128K RAM,  
one disk drive, DOS 2.1 or later.

CIRCLE 684 ON READER SERVICE CARD



**True BASIC**  
Addison-Wesley  
Publishing Co. Inc.  
One Jacob Way  
Reading, MA 01867  
(617) 944-3700  
**List Price:** \$149.90  
**Requires:** 192K RAM, one disk drive, DOS 2.x.

CIRCLE 683 ON READER SERVICE CARD



**WATCOM BASIC**  
415 Phillip St.  
Waterloo, Ontario N2L 3X2  
(519) 886-3700  
**List Price:** \$250  
**Requires:** 192K RAM, one  
disk drive, DOS 2.x.

CIRCLE 682 ON READER SERVICE CARD

BASIC (cassette, disk, and advanced) are all Microsoft products. So, too, are Versions 1.0 and 2.0 of the IBM Personal Computer BASIC Compiler. And, not to be outdone by itself, Microsoft also markets a BASIC compiler under its own label. It's called the Microsoft QuickBASIC Compiler.



For this review, *PC Magazine* combines the Microsoft QuickBASIC compiler and the IBM Personal Computer BASIC compiler because of their many similarities and the fact that both were born in the Microsoft shop.

These two compilers were introduced within a week of each other in late July, and, despite their similarities, they arrived on the market at opposite ends of the price spectrum. QuickBASIC lists for \$99 and was thus priced "to put a fast BASIC compiler within the reach of all BASIC users—hobbyists and recreational programmers as well as professional software developers," according to Microsoft. The IBM compiler, with a \$495 price tag, is targeted at the business professional. So, besides general pricing philosophy, what accounts for the \$400 price difference? The IBM package includes b-tree, ISAM file management utilities, and a library utility. Other than that, the features of the two compilers are identical.

The QuickBASIC compiler is actually Version 2.0 of Microsoft's original BASIC compiler. And the IBM compiler is Version 2.0 of the original IBM release. Both compilers have many new and improved features over their predecessors.

Most important of these features is the fact that traditional linear BASIC is taking the long-awaited turn toward facilities that let you use it to develop fully structured and modular programs.

For example, both QuickBASIC and the IBM compiler now support multiline subprograms and parameter passing with global or local variables. You can separately compile subprograms and then link them with the main program before you run it. You can also create libraries of separately compiled modules for other uses.

Another important change that both compilers implement makes line numbers optional while permitting alphanumeric labels—a giant step for programming purists. When subprograms and new multiline functions are used in an environment without line numbers, you can create BASIC programs that are just as structured as any Pascal program. This should end much of the grumbling among the ivory-tower types that BASIC is not a *real* language because of its lack of structure.

Other improvements to both QuickBASIC and IBM's compiler include new support for all of the sound, color, and graphics features of BASICA Version 3.0, (PLAY, SOUND, DRAW, GET, PUT, LINE, CIRCLE, COLOR, and so forth).

Programs can be significantly larger with these new BASIC products that allow

## Traditional linear BASIC is taking the long-awaited turn toward facilities that let you use it to develop fully-structured and modular programs.

a full 64K bytes of RAM for the program and another 64K bytes for data.

Another important change in both versions is the support of dynamic arrays—that is, arrays whose dimensions the pro-

gram can control.

The \$99 Microsoft QuickBASIC compiler has more than enough features to handle any but the most file-dependent applications. However, when you have a full database management project you want to solve with BASIC, the ISAM support in the IBM product (or ISAM support from an outside vendor such as Computer Control Systems' *FABS* or *Btrieve*) is a must.

IBM's b-tree, ISAM, is highly polished for operation with the IBM system; therefore, interface is simpler with the supplied ISAM than it is with ISAM from an outside vendor.

Both QuickBASIC and the IBM compiler are well documented, but as is often the case, IBM's documentation effort is best. The IBM package includes two manuals. The first is a tutorial and reference on BASIC in general, the compilation process, and ISAM theory. The other is a syntax reference with coverage of all BASIC keywords and commands.

Microsoft, on the other hand, offers a single manual. The major difference is that Microsoft documents only those BASIC keywords and functions that differ from similar interpreter BASIC keywords and

```
SOURCE
PROCS=0
STRUCTURE: REC
  STRING: RECORDS[132]
END STRUCTURE

REC: R1
INTEGER: RECNUM
STRING: STARTS[8],STOPS[8]
  1 ' File access test
  5 STARTS = TIME$
  10 OPEN "TEST.DAT" AS #1 LEN = SIZE (R1)
  30 FOR RECNUM = 1 TO 100
  40 WRITE RECORD #1 RECNUM R1
  50 NEXT RECNUM
  60 'read records back.
  70 FOR RECNUM = 1 TO 100
  80 READ RECORD #1 RECNUM R1
  90 NEXT RECNUM
  100 'modify and rewrite records.
  110 FOR RECNUM = 1 TO 100
  120 READ RECORD #1 RECNUM R1
  125 R1.RECORDS = "MODIFIED"
  130 WRITE RECORD #1 RECNUM R1
  150 NEXT RECNUM
  155 CLOSE
  160 STOPS = TIME$
  165 PRINT STARTS,STOPS
  170 END
ENDFILE
```

BetterBASIC: File access test.

functions. You are expected to use interpreter BASIC documentation for those language elements that are used identically in both environments.

Both of these products offer a run-time module (56K bytes for IBM; 58K bytes for Microsoft) that can be loaded and used by a series of compiled programs. Standard routines are kept in the run-time module; thus each of the compiled programs with access to the run-time module need not contain them. In a system with a number of program modules, this method can save significant disk space. If these run-time modules are used in commercial applications, they must be licensed with IBM or Microsoft.

Alternatively, you can opt to create standalone .EXE files that do not need run-time support. These files contain all the routines they'll need (and then some) and thus occupy more disk space than a run-time unit. Interestingly, these standalone programs seem to run about 12 percent faster after loading than those that use the run-time module.

Both the Microsoft and the IBM com-

```
SOURCE
PROCS=0
INTEGER: X
STRING: STARTS(8),STOPS(8)
1 'Integer count in BASIC
5 STARTS = TIMES
10 WHILE X < 32767 DO
20 X = X + 1
25 PRINT X
30 REPEAT
35 STOPS = TIMES
40 PRINT STARTS, STOPS
ENDFILE
```

BetterBASIC: Integer count test.

```
SOURCE
PROCS=0
REAL: X
STRING: AS[16],BS[49],CS[65],STARTS[16],STOPS[16]
1 'String concatenation test
7 STARTS = TIMES
10 FOR X = 1 TO 10000
20 AS = "This is a string"
30 BS = "This is a longer string with lots of words in it."
40 CS = AS+BS
50 NEXT X
55 STOPS = TIMES
60 PRINT STARTS,STOPS
ENDFILE
```

BetterBASIC: String concatenation test.

pilars are excellent products, truly the bedrocks of BASIC language compilers. Even if you're a professional BASIC programmer who may opt for some other system—BetterBASIC, perhaps—you may still want at least one of these Microsoft products (QuickBASIC or the IBM compiler, Version 2.0) on your shelf.

### True BASIC

Did you ever have one of those horrible moments in life where you slap yourself on the forehead and say, "Damn, I had that idea first, but somebody else made a million bucks out of it—I just gotta do something."

True BASIC is the result of one of those moments. Back in 1963, Dartmouth College professors John G. Kemeny and Thomas E. Kurtz responded to a college commitment that computers would become easily available to all students by designing a new language that would be easy to learn, yet useful for any programming task. The language, of course, is BASIC, and it is currently the most widely used computer language in the world—alas, largely due to the foresighted folks at Microsoft, not Kemeny and Kurtz.

According to Kemeny and Kurtz in the BASIC manual, the fate of BASIC in the world outside academia was not too bright. "When microcomputers first appeared, BASIC was the most popular language for them because it was a clean and simple language. The first microcomputers had very limited memories, so that implementors had to make a number of compromises—some of which were most unfortunate. Many of these compromises became

features of the language and were kept when the original reasons for compromising had disappeared. Today's personal computers are large and powerful machines that allow the implementation of a full modern BASIC. Yet the versions most widely used are what the trade calls Street BASIC—a horrible dialect of a beautiful

**When microcomputers first appeared on the market, BASIC was the most popular programming language because it was so simple.**

language."

Kemeny and Kurtz both agree that because "the authors of these languages violated the fundamental design principles of BASIC. Street BASIC is heavily dependent upon the particular hardware that is being used. The same BASIC program will not run on different personal computers; indeed, it typically cannot be run on two different models from the same manufacturer."

Last year Kemeny and Kurtz decided it was time to replace that obsolete and often ugly implementation of BASIC with a well-designed, modern version. True BASIC, obviously, is the Kemeny-Kurtz idea of a well-designed, modern version. It conforms closely to the latest drafts of the still-unsettled ANSI BASIC. And I'll have to admit that it's both modern and pretty, enabling you to attack your problems while adhering to the best principles of structured programming.

However, True BASIC is also bound to its interactive compiler and shows up erratically on the benchmark tests. Its execution time of our string concatenation benchmark was about half the time for the Microsoft, IBM, and BetterBASIC compilers. However, True BASIC's table-

lookup benchmark was several orders of magnitude greater than the others—minutes for True BASIC versus seconds for Microsoft, IBM, and BetterBASIC. True BASIC's control structures include IF-THEN-ELSE, SELECT-CASE, DO-WHILE, and DO-UNTIL.

Most of the True BASIC statements, commands, and built-in functions and procedures are similar enough to the more familiar Microsoft BASIC that they can be read easily. However, many have slight differences in syntax, and, therefore, writing a True BASIC program will take a bit of extra study. Some matters, such as file reading, writing, and maintenance, are entirely different from the more familiar forms of microcomputer BASIC. However, first time users will probably find it easier to grasp the file routines used by True BASIC.

Part of the Kemeny-Kurtz idea was to develop a highly transportable BASIC, a machine-independent language that closely adheres to the ANSI draft standard. At the same time, they wanted to keep the language interactive for programming ease. To meet these requirements, they went to an interactive compiler. Errors show up immediately, and a built-in help system usually pinpoints the error and suggests an appropriate correction.

True BASIC's compiler generates an intermediate corrected code that is then run against a machine-dependent module. The language stays portable because only the machine-dependent module must change.

True BASIC lets you use all the installed memory for your BASIC programs.

Documentation for True BASIC is nicely presented in two spiral-bound, soft-cover binders. One is a reference manual and the other is a user's guide that has instructions for the IBM PC.

It seems unlikely that True BASIC will replace the Microsoft and Microsoft look-alike BASICS—at least in this generation. But it is sure to gather a following, I suspect, particularly in teaching centers.

#### WATCOM BASIC

The WATCOM BASIC interpreter is a relatively new member of a family of lan-

guages and support systems developed and distributed by the University of Waterloo's computer systems group.

This package deserves consideration if you are thinking of developing applications on a microcomputer system that will ultimately be used in the minicomputer

**B**ASIC is the language for the guys in the trenches—when you gotta make a buck and the deadline's coming, you do it in BASIC.



world. WATCOM BASIC can produce executable programs for a number of different computers, including the Commodore SuperPET (MC6809 processor), the IBM PC, IBM 370, Digital VAX, Digital PRO series (pdp 11), and MC68000-based systems.

WATCOM BASIC is not only highly portable, it permits highly structured programming. Subprograms and multiline functions are supported as well as recursive functions.

WATCOM BASIC's syntax is quite similar to the customary Microsoft BASIC key words and statements. The only things

that are missing from this BASIC are those highly machine-dependent functions, that would destroy the portability of developed applications.

WATCOM BASIC comes packaged with a powerful standalone programming line editor called WEDIT. The editor, typical of mini and mainframe text editors, has fast search and replace features and can simultaneously manipulate multiple file segments.

Although WEDIT is nice to use, it is not necessary. You can develop WATCOM BASIC programs on any text editor or in the program's interactive interpreter environment. In fact, the interpreter manages its own file director, making loads, saves, and other file management chores easy from within either the interpreter or applications programs.

WATCOM BASIC allows you to use long names for variables and other program entities. Procedures can be called by these names and variables can be passed back and forth.

This implementation supports true integer arithmetic and bit logical operations using integers, and MAT statements support operations on entire matrices. WATCOM BASIC is relatively slow when compared with the other interpreters that are reviewed here, but that's the compromise that was made in order to gain a high degree of portability.

WATCOM BASIC is probably most valuable in educational or engineering environments that simultaneously use various machines and languages. The Waterloo group also has interpreter versions of APL, COBOL, FORTRAN, and Pascal, which all use the same full-screen editor that WATCOM BASIC does.

In addition, WATCOM produces several versions of FORTRAN, C, COBOL, BASIC, and Pascal for the IBM 370 and DEC VAX minicomputers. The company offers networking and terminal emulation capabilities for all machines supported by its languages.

The bottom line is that WATCOM BASIC is the ideal BASIC if you have to move applications programs all over the shop. In this sense, it seems to come closer than any other BASIC to bridging the micro-mini-mainframe canyons. ■



## The world's best selling monochrome graphics card for the IBM PC.

There are more Hercules<sup>™</sup> Graphics Cards in more IBM<sup>®</sup> PCs, XT's and AT's than any other monochrome graphics card in the world.

Over a quarter of a million demanding users around the world use a Hercules Graphics Card to improve the performance of their software.

### **The Lotus<sup>®</sup> 1-2-3<sup>®</sup> Booster.**

Consider Lotus 1-2-3.

Hercules gives an off-the-shelf copy of 1-2-3 the highest resolution possible on an IBM

PC, XT or AT. More 1-2-3 users choose the Hercules Graphics Card to get crisper text and sharper graphics than any other monochrome graphics card.

And we bring the same performance to other integrated programs like Symphony<sup>™</sup>, Framework<sup>™</sup>, and SuperCalc<sup>™</sup>3.

But we don't stop there. The Hercules Graphics Card

improves all kinds of software.

Like Microsoft<sup>®</sup> Word, a word processor that enables you to display text with subscripts, superscripts and italics.

Or pfs: Graph, an easy-to-use business graphics program that converts your data into presentation quality graphs.

Or Microsoft<sup>®</sup> Flight Simulator, the high flying game for the overworked executive.

Or our own Graph X<sup>™</sup>, a library of graphics sub-routines that eases graphics programming.

Or AutoCAD<sup>™</sup>, a computer aided design program that offers features normally associated with expensive CAD systems.

And we supply free software with each card to do hi-res graphics using the PC's BASIC interpreter. **State-Of-The-Art Hardware.**

The Hercules Graphics Card gives you graphics resolution of 720h x 348v and a

parallel printer port. Our unique static RAM buffer provides sharp 9 x 14 characters and flicker-free scrolling. Our exclusive safety features help

prevent damage to your monitor.

State-of-the-art custom IC technology delivers unsurpassed reliability. Ordinary graphics cards use up to 30 ICs to do what one Hercules IC does. By using fewer parts, we reduce the possibility of component failure.

Which is one reason we warrant the Hercules Graphics Card for two years. Unbeatable reliability. Advanced technology. Proven by over a quarter of a million users. Why settle for anything less than Hercules?

Call 1-800-532-0600 Ext 400 for the name of a Hercules dealer nearest you and we'll rush you our free info kit.

**Hercules.**  
We're strong on graphics.



COBO I

## COBOL: This language is widely used for programming business applications, but at age 25, is it fast enough to compete with other languages for the PC?

In the late 1950s, you couldn't do computer programming in low-level languages, such as assembly language, unless you had an engineer's intimate knowledge of the particular computer on which you wanted to run your programs. At best, it was an unsatisfactory situation. If computers were to become a useful business tool, an easier way had to be found to convey requirements to the computer. To this end, the Department of Defense convened the Conference on Data Systems Languages in 1959 to define a programming language for business data processing applications.

The conference determined that a language had to be machine independent, so that you could easily transport programs from one computer to another without having to rewrite them. The language also had to be easy to understand, so that it could be taught to and maintained by business people rather than engineers. But it also had to produce efficient object code because the programs had to run quickly enough not to bog down the computer or frustrate users.

The outcome of the conference was the Common Business Oriented Language, or COBOL. Since its inception, COBOL has been approved by and is periodically revised by the American National Standards Institute and is often called ANSI COBOL. The current published standard for COBOL is ANSI x3.23-1974.

Business data processing problems are very file-oriented because they entail a great deal of repetitive information, such as customer records or product types and quantities. These files need to be input using a language with procedures that perform a few mathematical or logical operations. The output is the modified files. COBOL facilitates file handling by recognizing a variety of file types, sorting and merging files, and generating printed reports from the file data. It has powerful verbs that carry out these functions without your having to code them in detail.

The tradeoff is that COBOL is not an ideal language for structured programming, although revisions of the ANSI standard, which are now under way, include several new features that will make COBOL more structured. Unlike in languages such as C and Logo, you cannot make up new commands (verbs) in COBOL. Nevertheless, its combination of features have made COBOL the most widely implemented programming language for busi-



*Among the COBOL compilers we reviewed, Micro Focus's VS COBOL Workbench is the clear winner, offering a panoply of programming tools. The forms facility paints screens and creates data descriptions. You can write your program with the editor, then check its syntax. The animator debug facility lets you halt execution at any point and inspect data. You can convert your finished program into a .EXE file with the build facility.*

ness applications.

Until recently, nearly all COBOL programming has taken place on mainframes. However, several manufacturers are now marketing COBOL for the PC, and *PC Magazine* tested all four available PC-COBOL compilers (see the benchmark tests). But it's really not enough to determine if these new COBOL compilers are bug-free, the additional productivity tools are well-designed, and the manual is clear. A more basic question is: Even though COBOL has been successful on mainframes, is it in fact a good programming language for the PC?

What really counts is speed. A language's speed is not determined by the wordiness of a program but to what extent the compiler can turn that source code into lean, fast machine code—a real challenge for any COBOL compiler for the PC.

A compiler can also obtain a speed edge at run time. Most compilers continue to do their input and output through DOS, an approach that makes the compiler more transportable but adds a layer of code that slows down processing. Alternatively, a compiler can bypass DOS and deal directly with the BIOS. This method significantly increases speed, but the company—and you—take on the responsibility of having to install revisions for each new model of your machine.

Speed and size are both affected by the way a COBOL implementation handles libraries. If the libraries are copied into the loading module, that module will be larger and will require more memory, but it will run faster because the library members are right there. The library members can also be dynamically called up at run time, creating a smaller load module that uses less RAM, but the libraries must be waiting in storage whenever you run the program. The processing time of this setup will be longer.

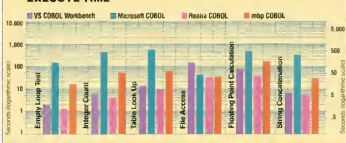
The size of COBOL source code or loading modules on PCs is a minor issue because both storage and memory are becoming cheaper and more plentiful.

### Custom Versus Store Bought

Besides speed, your type of application, such as whether it's a one-of-a-kind program or a generalized package, is another factor to consider before you buy a COBOL compiler for your PC. A major difference between mainframes and PCs is that the majority of mainframe systems are custom-written, while PCs usually run off-the-shelf packages. It's cost-efficient for large companies to invest in large-scale data processing environments and to develop systems from scratch. On the other hand, PCs are generally used on a comparatively limited scale, either by a smaller company in which it isn't economically feasible or for that matter necessary to write custom-tailored systems or in large

## COBOL

## EXECUTE TIME



## FILE SIZE (in bytes)

Empty Loop Test	1,792	896	4,480	11,000
Integer Count	1,792	896	4,480	11,000
Table Look Up	2,848	1,116	4,864	11,264
File Access	2,560	1,492	12,032	112,288
Floating Point Calculation	2,816	1,024	8,912	11,264
String Concatenation	1,792	1,178	4,736	11,520

## COMPILE TIME (in seconds)

Empty Loop Test	23	48	32	248
Integer Count	26	42	31	250
Table Look Up	33	41	35	270
File Access	40	57	37	300
Floating Point Calculation	32	38	36	252
String Concatenation	40	45	35	282

Benchmark test results for Microsoft COBOL, Microfocus VS COBOL Workbench, Realia COBOL, and mbp COBOL. Tests were run on an IBM PC with two floppy disk drives. All file sizes are listed in bytes, all times listed in seconds.

companies for spreadsheet work and word processing.

If you plan to custom-write business applications on the PC, you can do the coding more quickly in COBOL than in a lower-level language, and it will be easy to maintain because of its readability. COBOL's fast coding speed would also be valuable for companies that write packages if it weren't offset by COBOL's run speed, which is painfully slow, compared with the superior run times of assembly language and C.

## Mainframe Overload

Finally, PC COBOL can also off-load development from overworked mainframes. You test and code the program on the PC and then return it to the mainframe. However, COBOL on a mainframe is often used in conjunction with other software

that doesn't run on the PC, such as VSAM files, IMS databases, and transaction processors like CICS. Also, you must make sure that the same version of the language is used on both computers.

One last thing to keep in mind is that COBOL's popularity means that a lot of competent COBOL programmers are out there in the marketplace.

To accomplish the benchmark tests, we wrote a subprogram named TIMER that duplicates BASIC's TIMES utility. Because TIMER is a subprogram, its length was not included in the object module size, except in the case of the mbp compiler, in which we had to link, or combine, TIMER with each test program.

Is COBOL fast enough to compete with other languages on the PC, or is it, at age 25, too old and crotchety to take on these new-fangled computers?

## Microsoft COBOL

Microsoft COBOL is just what it claims to be and nothing more—a COBOL compiler, devoid of additional tools such as a program editor, animator, or a syntax checker. MS-COBOL follows the ANSI 1974 standard, but Microsoft has enhanced this compiler to make it more useful on the PC.

MS-COBOL has file- and record-locking capabilities built into its environment division. File locking is possible on any file, and record locking works on indexed and relative files. This capability would be invaluable in a file-sharing setup, such as a network or multiuser environment.

A great many of Microsoft's language enhancements are in the data division. MS-COBOL supports split-record keys, which link together several data items. Another augmentation is the sort status register, a useful field that indicates any errors that occurred during a sort. Microsoft also supports the data formats COMP-0, COMP-3, and COMP-4, all of which compress numeric data, reducing storage and increasing speed. Unfortunately, MS-COBOL does not support the standard COBOL "report writer" facility even though it greatly increases the efficiency of creating reports.

Microsoft has added a screen section to the data division that gives you reserved words for describing screen attributes, such as literals and automatic skipping to new fields. You use the screen section with new formats of the ACCEPT and DISPLAY statements of the procedure division to allow for interactive editing of data. Because this function is an extension of standard COBOL, it cannot be ported to a mainframe. It's surprising that Microsoft didn't offer a screen painter to make screen design easier.

MS-COBOL does not support the ANSI-standard DEBUG utility, but it does offer two alternatives. The first consists of the READY TRACE, RESET TRACE, and EXHIBIT statements of the procedure division, which have been included in COBOL compilers so often that they have become de facto standards. Since the READY TRACE and its related statements are a primitive debugging aid, Mi-



```

ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER. IBM-PC.
OBJECT-COMPUTER. IBM-PC.
DATA DIVISION.
WORKING-STORAGE SECTION.
77 THE-X PIC 9(5) VALUE ZERO.
01 START-TIME PIC 9(8).
01 END-TIME PIC 9(8).
PROCEDURE DIVISION.
A000-START.
    ACCEPT START-TIME FROM TIME.
    PERFORM A010-DO-NOTHING VARYING THE-X
        FROM 1 BY 1 UNTIL THE-X GREATER THAN 10000.
    ACCEPT END-TIME FROM TIME.
    CALL "TIMER" USING START-TIME END-TIME.
    STOP RUN.
A010-DO-NOTHING. EXIT.

```

#### VS COBOL Workbench: Empty loop test.

```

ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER. IBM-PC.
OBJECT-COMPUTER. IBM-PC.
DATA DIVISION.
WORKING-STORAGE SECTION.
77 THE-X PIC 9(5) VALUE ZERO.
01 START-TIME PIC 9(8).
01 END-TIME PIC 9(8).
PROCEDURE DIVISION.
A000-START.
    ACCEPT START-TIME FROM TIME.
    PERFORM A010-INCREMENT UNTIL THE-X NOT LESS THAN 32767.
    ACCEPT END-TIME FROM TIME.
    CALL "TIMER" USING START-TIME END-TIME.
    STOP RUN.
A010-INCREMENT.
    ADD 1 TO THE-X.

```

#### VS COBOL Workbench: Integer count test.

crossoft also offers its own interactive debugging facility, which can set breakpoints, monitor data items, go to a different line, and trace.

Before you can run your program, you must do several things. For the screen-handling facility to work, you have to run the installation program to configure the run-time executor and the MS-COBOL debugging facility to recognize the attributes of your particular terminal. If you are using ISAM files, you first preload the ISAM handler, a separate program, into memory. You then have to add the parameters FILES=10 and BUFFERS=20 to your CONFIG.SYS file.

Compiling a program is straightfor-

ward; but the output of this step is intermediate code rather than object or machine code. The run-time executor, which already includes the libraries, then dynamically loads the compiled intermediate-code program modules, converts the libraries and program modules to object code, and runs the program—all in one step. This approach streamlines the procedure, but it also significantly slows down the run time. Because you have to use the run-time module to run your programs, you can't create .COM or .EXE file output for other people to use. Instead, you must duplicate the run-time executor for each user and obtain a licensing agreement from Microsoft for each copy.

## PC FACT FILE



**mbp COBOL, Version 9.0**  
 mbp Software  
 1131 Harbor Bay Pkwy.,  
 #260  
 Alameda, CA 94501  
 (415) 769-5333  
 List Price: \$1,000  
 Requires: 192K RAM, two  
 disk drives, DOS 2.0 or later.

CIRCLE 675 ON READER SERVICE CARD



**Microsoft COBOL**  
 Microsoft Corp.  
 10700 Northup Way  
 Bellevue, WA 98004  
 (206) 828-8089  
 List Price: \$700  
 Requires: 192K RAM, two  
 disk drives, DOS 2.0 or later.

CIRCLE 674 ON READER SERVICE CARD



**Realia COBOL,**  
 Version 1.0  
 Realia Inc.  
 10 S. Riverside Plaza  
 Chicago, IL 60606  
 (312) 346-0642  
 List Price: \$995

Requires: 160K RAM, two  
 disk drives, DOS 2.0 or later; an IBM VS  
 COBOL manual; GC2638573 is recommended.

CIRCLE 673 ON READER SERVICE CARD



**VS COBOL Workbench**  
 Micro Focus Inc.  
 2465 E. Bayshore Rd., #400  
 Palo Alto, CA 94303  
 (415) 856-4161  
 List Price: \$4,000

Requires: 256K RAM,  
 two disk drives, DOS 2.0 or later.

CIRCLE 672 ON READER SERVICE CARD

Microsoft's language extensions make MS-COBOL a more powerful PC tool. Yet all of these enhancements are additions rather than changes. Therefore, if you plan to upload your programs to a mainframe environment, you should not have any coding problems. The package would be enriched by a program editor and a more powerful debugging facility. Microsoft also needs to replace the run-time executor with separate linking and run steps because MS-COBOL's run times are too slow.

#### VS COBOL Workbench

Micro Focus's VS COBOL Workbench is aptly named. In addition to the

COBOL compiler, the Workbench offers other tools to help you enter and edit your program, check syntax, debug your program, and create a standalone, executable module.

While Workbench is based on the ANSI standard, it also includes elements from IBM VS compilers and innovations of its own. These differences make this COBOL easier to use on the PC, but they are likely to cause errors when you run your PC-developed program on a mainframe.

Workbench's environment division includes a lock clause. This clause is useful in a multiuser environment because it lets you specify exclusive or shared use of a file.

An unfortunate decision of Micro Focus's was to omit the report section of the data division. This section supports the report writer utility that greatly speeds up the generation of reports and is widely used on mainframes. The company has retained all internal data formats in the data division except floating point.

The procedure division has several augmentations. Explicit scope delimiters of the type END-ADD and END-IF make it easier to write structured programs. Negated exceptions, such as NOT ON SIZE ERROR and NOT AT END, help you isolate conditions that fail to occur. The Workbench also lets you put COPY statements into your copy libraries, which nest COPY statements.

Additional verbs in the procedure division include CONTINUE, a useful no-operation statement; EVALUATE, which compares subjects of the evaluation with one or more objects and helps you detect a complex state and then take an appropriate action; and INITIALIZE, which sets a list of data items to zeros, spaces, or a user-defined character.

Micro Focus has turned COBOL's ACCEPT and DISPLAY verbs into very useful PC-oriented screen-painting tools. Once you use the Workbench's forms utility to place data fields on-screen, the Workbench creates two copy library members. The first of these contains the standard COBOL data descriptions for the display screen data fields, and the second includes procedure division code to accept

```

ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER. IBM-PC.
OBJECT-COMPUTER. IBM-PC.
DATA DIVISION.
WORKING-STORAGE SECTION.
77 THE-X PIC 9(5) VALUE ZERO.
01 THE-INTEGER.
   05 THE-A PIC 9(5)V99.
   05 THE-B PIC 9(5)V99.
   05 THE-C PIC 9(5)V99.
01 START-TIME PIC 9(8).
01 END-TIME PIC 9(8).
PROCEDURE DIVISION.
A000-START.
  ACCEPT START-TIME FROM TIME.
  PERFORM A010-CALC VARYING THE-X FROM 1 BY 1
    UNTIL THE-X GREATER THAN 10000.
  ACCEPT END-TIME FROM TIME.
  CALL "TIMER" USING START-TIME END-TIME.
  STOP RUN.
A010-CALC.
  MOVE ZERO TO THE-A.
  MOVE 1234.56 TO THE-B.
  MOVE 78.9 TO THE-C.
  COMPUTE THE-A = THE-B * THE-C.
  COMPUTE THE-A = THE-B / THE-C.

```

VS COBOL Workbench: Floating-point test.

```

ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER. IBM-PC.
OBJECT-COMPUTER. IBM-PC.
DATA DIVISION.
WORKING-STORAGE SECTION.
77 THE-X PIC 9(5) VALUE ZERO.
01 THE-STRINGS.
   05 THE-A PIC X(20).
   05 THE-B PIC X(60).
   05 THE-C PIC X(50).
01 START-TIME PIC 9(8).
01 END-TIME PIC 9(8).
PROCEDURE DIVISION.
A000-START.
  ACCEPT START-TIME FROM TIME.
  PERFORM A010-STRING VARYING THE-X FROM 1 BY 1
    UNTIL THE-X GREATER THAN 10000.
  ACCEPT END-TIME FROM TIME.
  CALL "TIMER" USING START-TIME END-TIME.
  STOP RUN.
A010-STRING.
  MOVE "THIS IS A STRING" TO THE-A.
  MOVE "THIS IS A LONGER STRING WITH LOTS OF WORDS IN IT."
    TO THE-B.
  STRING THE-A THE-B
    DELIMITED BY SIZE
    INTO THE-C.

```

VS COBOL Workbench: String concatenation test.

```

ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER. IBM-PC.
OBJECT-COMPUTER. IBM-PC.
DATA DIVISION.
WORKING-STORAGE SECTION.
77 THE-X PIC 9(5) VALUE ZERO.
77 LOOP PIC 9(5) VALUE ZERO.
81 THE-A-TABLE.
05 THE-A OCCURS 25 TIMES PIC 99.
81 THE-B2-TABLE.
05 FILLER PIC X(10) VALUE "0102030405".
05 FILLER PIC X(10) VALUE "0607080910".
05 FILLER PIC X(10) VALUE "1112131415".
05 FILLER PIC X(10) VALUE "1617181920".
05 FILLER PIC X(10) VALUE "2122232425".
81 THE-B2-TBL REDEFINES THE-B2-TABLE.
05 THE-B2 OCCURS 25 TIMES PIC 99.
81 START-TIME PIC 9(8).
81 END-TIME PIC 9(8).
PROCEDURE DIVISION.
A000-START.
ACCEPT START-TIME FROM TIME.
PERFORM A010-MOVE VARYING THE-X FROM 1 BY 1
UNTIL THE-X GREATER THAN 1000
AFTER LOOP FROM 1 BY 1
UNTIL LOOP GREATER THAN 25.
ACCEPT END-TIME FROM TIME.
CALL "TIMER" USING START-TIME END-TIME.
STOP RUN.
A010-MOVE.
MOVE THE-B2 (LOOP) TO THE-A (LOOP).

```

#### VS COBOL Workbench: Table lookup test.

```

ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER. IBM-PC.
OBJECT-COMPUTER. IBM-PC.
INPUT-OUTPUT SECTION.
FILE-CONTROL.
SELECT TEST-FILE ASSIGN TO EXT-FILENAME
ORGANIZATION IS RELATIVE
ACCESS MODE IS RANDOM
RELATIVE KEY IS FIELD1.
DATA DIVISION.
FILE SECTION.
FD TEST-FILE
LABEL RECORDS STANDARD
RECORD CONTAINS 132 CHARACTERS
DATA RECORD TEST-REC.
81 TEST-REC.
05 RECORD-DOLLAR PIC X(132).
WORKING-STORAGE SECTION.
77 FIELD1 PIC 9(5).
77 THE-X PIC 9(5) VALUE ZERO.
77 EXT-FILENAME PIC X(10) VALUE "B:TEST.DAT".
81 START-TIME PIC 9(8).
81 END-TIME PIC 9(8).
PROCEDURE DIVISION.
A000-START.
ACCEPT START-TIME FROM TIME.
OPEN I-O TEST-FILE.
PERFORM A010-WRITE VARYING THE-X FROM 1 BY 1
UNTIL THE-X GREATER THAN 100.
MOVE 1 TO THE-X.
PERFORM A020-READ VARYING THE-X FROM 1 BY 1

```

(continues)

#### VS COBOL Workbench: File access test.

and display the screen. The FORMS facility also puts the accompanying COPY statements into your program. Despite the success of the FORMS utility on the PC, it can't be ported to mainframes; the monitors are different from those used with PCs, and Micro Focus's enhanced ACCEPT and DISPLAY verbs aren't standard COBOL.

In addition to the compiler, the Workbench offers a program editor. For some reason, this editor does not do line numbering, but it satisfactorily performs most other editing functions.

The syntax checker receives COBOL source code, finds language errors, and delivers intermediate-level code. You can directly compile this code into machine code or test it further with the "animator," the highlight of the Workbench. The animator is an excellent debugging tool that allows you to set breakpoints, change data items, and trace execution through subprograms.

Once you have compiled your program, you execute it with the RUN facility. If other people are going to use the program, you wouldn't want them to have to buy the Workbench just to run it, so the Workbench includes a BUILD facility that converts your compiler output to .COM files and a COM2EXE utility to convert files over 64K bytes to .EXE files.

The Workbench also includes a session recorder. You can use it to keep track of all your keystrokes, which is useful for training users and locating problems.

The Micro Focus VS COBOL Workbench offers a lot more than just a COBOL compiler. The components have been tailored to take advantage of microcomputers, so while the programs you produce with the Workbench can certainly be ported to a mainframe, they will run best on a PC.

#### Realia COBOL

Realia Inc.'s COBOL takes IBM's VS COBOL as its guide. Like its mainframe counterpart, Realia COBOL is command-driven rather than menu-driven. Stepping right into the footprints of its mainframe leader, the package doesn't even include a language manual but suggests that you purchase an IBM VS COBOL (main-

(File access test continued)

UNTIL THE-X	GREATER THAN 100.
MOVE 1	TO THE-X.
PERFORM A030-MODIFY VARYING	THE-X FROM 1 BY 1
UNTIL THE-X	GREATER THAN 100.
CLOSE	TEST-FILE.
ACCEPT END-TIME	FROM TIME.
CALL "TIMER" USING START-TIME END-TIME.	
STOP RUN.	
A010-WRITE.	
MOVE THE-X	TO FIELD1.
WRITE TEST-REC	INVALID KEY STOP RUN.
A020-READ.	
READ TEST-FILE	INVALID KEY STOP RUN.
A030-MODIFY.	
PERFORM A020-READ.	
MOVE "MODIFIED"	TO RECORD-DOLLAR.
PERFORM A032-REWRITE.	
A032-REWRITE.	
REWRITE TEST-REC	INVALID KEY STOP RUN.

frame) manual to use in conjunction with Realia's user manual. You can purchase the IBM manual from Realia for \$25 plus shipping or, better yet, from IBM for \$17 plus tax.

Realia COBOL is missing some features from both ANSI and VS COBOL standards, but it has several extensions, some of which are based on the proposed changes to the ANSI standard and some of which improve efficiency and flexibility on the PC. For instance, in the environment division, Realia has added several means for associating internal filenames with DOS files. You can assign a file directly to a literal containing a DOS filename or you can assign it to a data item and associate the internal and external filenames with the DOS SET command. The compiler does not support the EBCDIC collating sequence, which means you can't upload your Realia program to a mainframe.

The data division is missing both the report writer and the communications program. A nice enhancement, based on the proposed ANSI COBOL revision, is that it allows condition names or 88s to be set to TRUE. This would allow 88s to be set as well as tested.

Although the procedure division does not support the SORT/MERGE command, it does include 16 explicit scope delimiters, including END-IF and END-COMPUTE. The in-line PERFORM statement allows you to place the code to be performed immediately following the PERFORM command. This procedure

speeds up execution by eliminating branching. You can use the TEST BEFORE and TEST AFTER clauses to indicate whether you should do limit testing before or after the UNTIL phrase of the PERFORM statement. The DELETE FILE statement lets you delete an entire file, rather than just a record, from within a COBOL program.

In addition to the language extensions, Realia COBOL includes an interface that lets you call DOS facilities from within COBOL programs and a program for interfacing with Lattice C programs via calls.

The Realia Editor (RED) is completely command-driven, though most of the commands are not letters or mnemonics but combinations of the nonalphanumeric keys. These combinations are difficult to remember unless you frequently use the editor. To use any of the nine commands activated with alpha keys, you must first press the Esc key. RED does have some nice features, such as line numbering and a recovery mode in case your system crashes during an edit. However, an SPF-like, menu-driven program editor is much easier to use.

Realia's COBOL compiler, REAL-COB, can accept compile parameters either from switches appended to the command line or from directives included in the source file. You can direct the compiler to do such things as check for data exceptions and subscript ranges. You can also ask it to treat PERFORM statements such as CALL, which increases the efficiency of the compiler. Most parameters can be

put into effect by either a switch or a directive but not by both. This means that you will usually have to look in both places to confirm your parameters.

REALCOB can produce a full cross-reference listing, similar to that on IBM mainframes. This listing is especially useful for long or multiple programs.

The Realia compiler relies on the DOS linker to create load modules. You can use the linker to combine COBOL programs, or you can wait until run time to call subprograms. With so many options and steps, it will be worthwhile for you to set up a batch file to run the compile and link process. It would have been nice of Realia to set up menus to guide you through these steps.

Realia does not support the ANSI standard COBOL DEBUG, but it offers its own debugger, FOLLOW THE SOURCE, as a replacement. The Realia debugger has an extensive set of commands, including ones to modify subscripts and set a range of lines to be executed. You can debug COBOL programs with the CALL command from an initial program and can display on-line help.

A mainframe COBOL programmer will feel right at home with Realia, but a PC user new to COBOL will want more guidance than Realia offers.

## mbp COBOL

Mbp COBOL is a European entry in the COBOL sweepstakes, produced by mbp Germany in Dortmund, West Germany, and marketed here by mbp Software in Alameda, California. Mbp has been a software consulting firm for nearly 30 years and has recently entered the retail arena. The mbp COBOL is entitled "ANSI '74 COBOL compiler," and the language elements closely follow the standard. Mbp has added some utilities that give mbp COBOL a distinctive personality.

In the environment division, mbp has made a small but necessary extension to the SELECT-ASSIGN statement so that the compiler will recognize DOS-format filenames. The data division change is equally small; hexadecimal constants are permissible.

Mbp's screen management system

(SMS) is a utility that helps you paint menus or data entry screens. Most commonly, a screen painter eases the handling of screen I/O by generating much of the working-storage code, often placing it in COBOL copy libraries. You use ACCEPT, DISPLAY, or CALL commands in the procedure division to pass control to the screen painter, which does the screen I/O for you. Mbp COBOL uses CALLs. The SMS screen painter generates I/O masks, which it places in SMS mask libraries—not COBOL copy libraries. Therefore, you must still write your own working-storage screen descriptions. This means that to change a screen, you must change both the I/O mask and the program. SMS could reduce this effort by generating the working-storage code for you.

Mbp has a special utility for dynamically calling COBOL programs at run time. Usually COBOL requires you to put calls to the subprograms in the procedure division of the main program and pass arguments to the subprograms' linkage sections. Mbp's technique bypasses the linkage section. Instead, you must execute the main program with the CHAIN command. The called program then picks up the passed arguments by calling CHAIN, rather than by using the linkage section. Using this technique in the COBOL benchmark tests would have required changing the program code, so we used static linking instead. Unfortunately, this meant that the TIMER module had to be linked into the test programs, increasing the size of each .EXE module.

This COBOL package has an especially strong emphasis on segmentation and overlays. This means of dividing a program into segments that stay in memory and those that can be overlaid by new segments is standard COBOL, and it used to be helpful when computers had limited memory as compared with the program size. It's rarely needed now and hardly deserves the emphasis mbp gives it.

Mbp's ISAM maintenance utility is helpful for reorganizing ISAM files, while network versions of mbp COBOL offer record locking to support several PC networks.

The mbp's compiler works fine once you get rid of your syntax errors. A miss-

ing hyphen in the phrase FILE-CONTROL caused 45 errors; fixing it reduced the errors to zero. Since FILE-CONTROL and similar phrases are required in COBOL, most compilers will, in this instance, put out a message saying "FILE-CONTROL not found; assumed present" and let it pass. The compiler listing spreads

**C**OBOL is the ultimate business language—it is quick, easy to learn and to read, and handles large data files with precision.



a lot of extraneous information over five pages and doesn't give you a way to reduce the amount of printed material. The listing also prints 132 characters across, requiring you to set your printer accordingly.

You use the DOS linker to link your programs and mbp's run-time module to execute them. The cost of mbp includes 25 copies of the run-time module, allowing that many people to use your programs without having to buy the full package.

Some of mbp's COBOL utilities seem unnecessarily complex, like the screen management system, dynamic calls through chaining, and program segmentation techniques. The relative inaccessibility of these utilities is compounded by the manual, which makes simple concepts hard to understand. The mbp compiler can be recommended for its leanness and because it adheres so closely to the ANSI standard, but the company could have improved its COBOL package by streamlining the auxiliary facilities as well. ■

## Try It. Then Buy It. PC-Write.

A fast, full-featured word processing package for the unbelievable price of \$10. Complete. You get a manual on disk, mail merge, split screen, keyboard macros, on-screen formatting, full printer support, and more.

Try PC-Write for \$10. Then register for \$75 to get:

- latest diskette
- printed manual
- two updates
- phone support
- newsletter

Registration supports our "shareware" concept that keeps our prices low, and allows our development of PC-Write enhancements.

Shareware means you can get PC-Write from a friend or user group to try, and give away copies yourself. Then register if you like it. No risk!

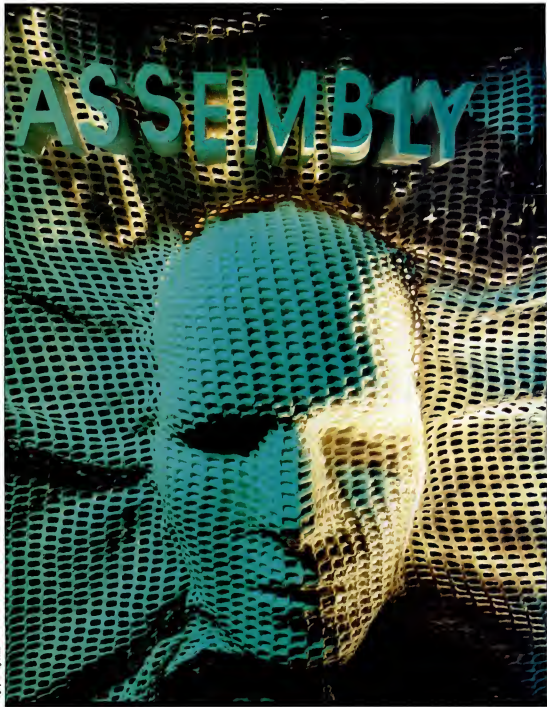
PC Magazine  
Oct 29, 1985  
Look up the  
rave review of  
PC-Write version 1.3  
in the 2/21/84 issue  
of PC. Our current  
version 2.55 has many  
new features, like print  
and file directory right  
in the editor itself.



**Order PC-Write Today.**  
Satisfaction Guaranteed.

*Quincy*  
(206) 282-0452  
219 First N. #224v  
Seattle, WA 98109





## ASSEMBLER: If you master this devilishly difficult language, it will reward you with the tightest code, fastest execution, and the most gratifying experience on the PC.

It's two o'clock in the morning, and the first part of your new assembly language program almost works. The listing is four pages long and full of instructions like MOV, JMP, SHR, ADC, MUL, DIV, PUSH, and POP. None of the individual instructions gives the slightest clue as to what they're supposed to do in tandem. You feel as if you're trying to construct a suspension bridge out of toothpicks. What does the program do so far? Well, it does something equivalent to the BASIC statement

```
INPUT "Enter 3 numbers: ".A,B,C
```

It still needs work. If one of the numbers entered has two decimal points, the program crashes and fills the screen with ampersands. It fills the screen instantaneously, so it's fun to watch, but you still have to get rid of that bug. Do it tomorrow? No, you're so close now that another hour or two won't hurt.

One thing's for sure, though. Getting an assembly program to run properly has to be one of personal computing's most gratifying experiences: You've accomplished one of the most difficult things you can do on the PC.

An assembly language program translates directly into machine code that the computer's microprocessor reads from memory and executes. Higher-level languages are also translated into machine code by a compiler, but the translation is done in a generalized and roundabout manner that leaves the resultant program bloated and sluggish. Until compilers become smarter than people, assembly language will continue to be the one that produces the tightest code and the fastest execution. In the hands of a master, assembly language can create power-programs like Lotus's 1-2-3, speed-demons like Xy-Write, and the unbelievably tiny Turbo Pascal compiler and editor.

Why aren't all programs written in assembly language? There are some very

good reasons why not. Every computer has its own assembly language, and each is different because the language is dependent upon the architecture of the machine. The big problem with assembly language, particularly from the viewpoint of a company developing commercial software, is the lack of portability. Programs written for one machine must often be almost completely rewritten to run on another machine that uses a different microprocessor.



**IBM's Macro Assembler** is the top choice in its field for one reason: The documentation is outstanding. The IBM manual is simply the best reference source around on 8086/8088 assembler instructions. Version 2.0 corrects most of the bugs that were found in its predecessor and incorporates some additional features that make it a solid product that should be part of every serious PC user's software library.

### Byte the Devil

The assembly language used on the IBM PC is called 8086/8088 Assembly Language, named after the microprocessor that runs the PC. It is a devilishly difficult language to learn, master, and maintain. Since each line of source code translates into 1 to 6 bytes of machine code, assembly language source programs are generally huge compared with the files they create. The language has no inherent structure: Within 8086/8088 assembly, for instance, there are 32 variations of the JUMP instruction. Unlike in most higher-level languages, you can't program in assembly unless you jump around a lot.

8086/8088 Assembly Language has no PRINT statement, no INPUT statement, and can do arithmetic only on integers. You say you need to do floating-point calculations? Would you like to program your own floating-point routines? For reading

the keyboard, printing to the screen, and accessing files, an assembly language programmer must not only learn the assembly language mnemonics but must be intimately familiar with the PC-DOS function calls and BIOS services.

Even the simple act of converting a number stored in hexadecimal into readable decimal ASCII (which most programmers do without thinking by using a PRINT statement or the equivalent) becomes a large subroutine, with logic dedicated to rounding, suppressing leading zeros, and putting commas and decimal points in the right places. Having total control means also that you have to take care of everything.

The program that translates your assembly language source into machine code is the assembler. The assembler won't tell you if your PUSHes and POPs aren't paired up right or if you've forgotten a RET statement. You'll find out soon enough, though—a system crash is the normal result of running an assembly language program in the early stages of development.

At times, a veteran assembly language programmer will pull his or her bleary eyes from the display and say, "It's just not worth it. Maybe I should do this in Pascal or C." It's certainly a temptation, and many programmers and companies are going that route. Yet assembly language still retains a certain mystique and functionality. You can create a useful program (a rudimentary WordStar-to-ASCII converter, for instance) with a .COM file of less than 20 bytes. Some programs, such as utilities that remain resident in memory, can realistically be programmed only in assembly language.

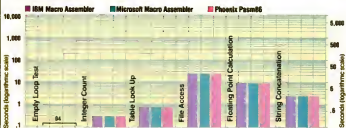
### Assembly Hall of Fame

PC Magazine restricted the survey to three professional, full-featured macro assemblers from IBM, Microsoft, and a new entry from Phoenix. A macro assembler



## ASSEMBLER

## EXECUTE TIME



## FILE SIZE (in bytes)

Empty Loop Test	84	84	84
Integer Count	89	89	89
Table Look Up	315	315	315
File Access	276	276	276
Floating Point Calculation	566	566	566
String Concatenation	442	442	442

## COMPILE TIME (in seconds)

Empty Loop Test	22	20	17
Integer Count	22	21	18
Table Look Up	24	23	20
File Access	20	27	20
Floating Point Calculation	42	40	26
String Concatenation	23	23	19

Benchmark test results for IBM Macro Assembler, Microsoft Macro Assembler, and Phoenix Pasm86 Macro Assembler. Tests were run on an IBM PC with two floppy disk drives, without an 8087 coprocessor. All file sizes are listed in bytes, all times listed in seconds. Note: File sizes and execute times are the same for each package because assembly language code does not vary among different assemblers. The file access test when performed with a hard disk yielded a significantly faster result for all products.

lets you save commonly used code with replaceable parameters in separate files and, in turn, use this code by just specifying the name of the macro.

In coding the six test programs, we tried to be fair to high-level language readers. The string concatenation test is somewhat generalized, for instance, and the table-lookup test avoids use of the fast REP MOVSW instruction.

The floating-point subroutines used were developed by Robert Gray and published in the series "Significant Figures" (*PC Tech Journal*, Volume 2 Numbers 4 and 5). The ASM listing of these routines to multiply and divide single-precision numbers were five pages long.

Using an 8087 floating-point coprocessor

speeds up and simplifies floating-point calculations immensely since the 8087 instructions can be used directly in the .ASM file. (All three assemblers tested support the 8087.) The complete program using the 8087 was a 136-byte .COM file, of which over half was devoted just to print the elapsed time. The 10,000 floating-point multiplications and divisions took the 8087 just under 1.5 seconds. Amazing? No, just assembly language.

## IBM Macro Assembler

The IBM Macro Assembler, Version 2.0, is the obvious top choice in the field. This package includes an attractive two-volume manual and one program disk. Al-

though the MASM.EXE program shares a copyright between IBM and Microsoft (and is very similar to the new Microsoft assembler), the IBM manual clearly makes this the superior package. It is simply the best reference source I've seen on 8086/8088 Assembly Language instructions.

The biggest change from Version 1.0 of IBM's Macro Assembler is the addition of instructions for the 8087/80287 coprocessor and the 80286 in real-address nonprotected mode.

Thankfully, most of the glaring bugs in Version 1.0 of IBM's assembler have been exterminated. The SHR and SHL pseudops now work as they should, and the type checking has been improved by a significant margin. Amazingly for usually taciturn IBM, the manual actually admits that the previous version did not always work as documented.

As a real improvement over Version 1.0 of the assembler, Version 2.0's manual (and sample skeleton files on disk) actually show you what's needed to create an executable assembly language program. It may sound trivial, but the process really stumped a lot of people who started with Version 1.0. There's even a good solid discussion of .COM- and .EXE-file structures and the advantages and disadvantages of each.

Programmers who worked in assembly language before the IBM PC appeared on the scene often bemoaned the absence of a library utility in the earlier version of the assembler. A library is a collection of often-used subroutines stored in OBJ format that can be pulled into a program in the linking process.

Version 2.0 of the Macro Assembler includes LIB, a plain-vanilla library manager also sharing a Microsoft copyright. Unfortunately, the IBM manual uncharacteristically falls down in its discussion of the LIB facility, devoting a mere ten pages to the program and covering only command-line syntax. The principles of constructing a good library (such as using consistent segment names and providing for near and far versions) are not discussed at all.

Thirty-eight pages of the manual, however, are devoted to an IBM-developed

```

CSEG      Segment Public 'CODE'
          Assume  CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG

          Extern  StartTimeNear, PrintTimeNear

          Org     $100h

Entry:    Cell    StartTime          ; External Subroutine

          Mov     CX,10000           ; 10,000 repetitions
Test1Loop: Loop    Test1Loop         ; Same line loop

          Call    PrintTime          ; External Subroutine
          Int     20h               ; Exit Program

CSEG      EndS

          End     Entry

```

#### IBM Macro Assembler: Empty loop test.

```

CSEG      Segment Public 'CODE'
          Assume  CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG

          Extern  StartTimeNear, PrintTimeNear

          Org     $100h

Entry:    Cell    StartTime          ; External Subroutine

          Sub     AX,AX              ; AX starts at zero
          Cmp     AX,32767           ; Count until 32767
          Jc      Test2End           ;
          Inc     AX                 ; Otherwise increment
          Jmp     Test2Loop          ; And do it again

          Test2End: Cell    PrintTime ; External Subroutine
                  Int     20h       ; Exit

CSEG      EndS

          End     Entry

```

#### IBM Macro Assembler: Integer count test.

```

CSEG      Segment Public 'CODE'
          Assume  CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG

          Extern  StartTimeNear, PrintTimeNear

          Org     $100h

Entry:    Jmp     Test4              ; Skip over date

ShortString db (ShortStringEnd - ShortString - 1) ; Length
            db 'This is a string' ; String
ShortStringEnd Label Byte

LongString db (LongStringEnd - LongString - 1)
            db 'This is a string with lots of words in it.'
LongStringEnd Label Byte

CatString db 8,255 dup (0)

Test4:    Call    StartTime          ; External Subroutine

          Cld                     ; String Moves forward
          Mov     CX,10000           ; Number of Repetitions

Test4Loop: Push    CX

          Mov     SI,Offset ShortString
          Ld     DI,AL              ; Get length
          Mov     DI,AL              ; Save length of string
          Sub     AX,AX              ; Zero out type byte
          Mov     CX,AX              ; CX = length
          Mov     DI,DI + Offset CatString ; Destination
          Rpb     Moveb             ; Move it in

          (continues)

```

#### IBM Macro Assembler: String concatenation test.

### PC FACT FILE



**Macro Assembler,  
Version 2.0**  
IBM Entry Systems  
Old Orchard Rd.  
Armonk, NY 10504  
(914) 765-1900  
List Price: \$175

**Requires:** 128K RAM, one double-sided disk drive, DOS 1.1 or higher.

CIRCLE 689 ON READER SERVICE CARD



**Macro Assembler,  
Version 3.0**  
Microsoft Corp.  
10700 Northup Way  
Bellevue, WA 98009  
(206) 828-8080  
List Price: \$150

**Requires:** 128K RAM, one double-sided disk drive, DOS 2.x.

CIRCLE 688 ON READER SERVICE CARD



**Pass86, Version 1.01**  
Phoenix Computer Products  
1420 Providence Hwy., #115  
Norwood, MA 02062  
(617) 762-5030  
List Price: \$295  
**Requires:** 100K RAM,  
DOS 2.x.

CIRCLE 687 ON READER SERVICE CARD

preprocessor called SALUT (Structured Assembly Language Utilities). To use it, you write programs with the .SAL extension, which includes specially structured statements for controlling program flow. You then run SALUT, which translates the listing into an .ASM file to be assembled by MASM.

It's an interesting and even worthwhile idea to try to add some structure to assembly language programs, but the first time you run SALUT and you hear your printer reset (a good sign that SALUT was programmed in BASIC), it really turns you off. Using a BASIC program to preprocess structured utilities in an assembler program is just too surreal for me.

A good library system is much more important than a wimpy preprocessor like SALUT, and I'm sorry IBM did not take the opportunity to discuss library management with the detail it deserves.

IBM's package includes a linking program, a cross-reference utility, and a smaller version of the assembler called ASM. ASM does not support macros or

## ASSEMBLER

8087 instructions, and it lists errors by number only. It's only useful if you're really hurting for memory.

The IBM Macro Assembler is a good, solid, full-featured program with a manual that opens the package up for both beginners and experienced programmers. It should be a part of every serious PC user's software library.

### Microsoft Macro Assembler

The Microsoft Macro Assembler, Version 3.0, is nearly identical to the IBM Macro Assembler Version 2.0, but with a few added features. While it also includes 8087, 80287, and 80286 instructions in nonprotected mode, Microsoft's assembler adds the protected-mode 80286 instructions. (However, these instructions have very limited value to most programmers.) While the package does not have anything like the IBM SALUT program (which is no great loss), Microsoft includes LIB, MAKE (a program maintainer), and SYMDEB, a nifty symbolic debugger. SYMDEB alone is worth the price of the package and can be used with other Microsoft language products.

The Microsoft manual, however, is a disaster. It is badly printed and difficult to use. If you buy this package, you will need some other reference source for the assembly language instructions because each instruction is documented by exactly one line of text, like "JCXZ label—Jump on CX zero" or "Loop label—Loop."

Like IBM, Microsoft includes a LIB program with a 14-page explanatory discussion in the manual. Microsoft's information is more helpful than that supplied by IBM, but again doesn't come close to what is really required. A program unique to the Microsoft package is MAKE, a program maintainer. When set up with the proper description file, this program checks file-change dates on your .ASM, .OBJ, .MAP, and .EXE files and does any necessary assembling or linking to bring everything up to date.

### SYMDEB

The real jewel of the Microsoft package is SYMDEB, a symbolic debugger. It looks and acts like a souped-up version of

(String concatenation test continued)

```

Mov     SI,Offset LongString
Lodsb   ; Length of second string
Mov     CX,AX      ; Set to CX also
Add     AL,DL      ; AL = Length of both strings
Znc     StringLengthOK ; If under 255, no problem
Mov     AL,255     ; Truncated length of total string
Mov     CL,AL      ; Now CX = 255
Sub     CL,DL      ; Now CX = truncated length of 2nd
Rep     Movsb      ; Move in 2nd string after first
Mov     CX,[CetString],AL ; Put in the total length
Pop     ; Get back repetition counter
Loop    Test4Loop  ; Do it CX times
Call    PrintTime  ; External Subroutine
Int     20h        ; Exit
CSEG
End     Entry

```

```

CSEG      Segment Public 'CODE'
Assume    CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG

Extrn     StartTimeNear, PrintTimeNear

Org       $100h

Entry:    Jmp     Test5          ; Skip over data

Array1    dd      1.0, 2.0, 3.0, 4.0, 5.0
          dd      6.0, 7.0, 8.0, 9.0, 10.0
          dd      11.0, 12.0, 13.0, 14.0, 15.0
          dd      16.0, 17.0, 18.0, 19.0, 20.0
          dd      21.0, 22.0, 23.0, 24.0, 25.0

Array2    dd      25 dup (?)

Test5:     Call    StartTime      ; External Subroutine
          Mov     CX,1000        ; Number of trials

Test5Loop: Push    CX
          Sub     BX,BX          ; Initial Index
          Mov     CX,25         ; Number to move

Test5Move: Mov     AX,Word Ptr Array1[BX] ; Get from first
          Mov     DX,Word Ptr Array1[BX + 2]
          Mov     Word Ptr Array2[BX],AX ; Put into second
          Mov     Word Ptr Array2[BX + 2],DX
          Add     BX,4          ; Push up BX
          Loop    Test5Move

          Pop     CX
          Loop    Test5Loop      ; Do it 1000 times

          Call    PrintTime      ; External Subroutine
          Int     20h           ; Exit

CSEG      EndS
          End     Entry

```

### IBM Macro Assembler: Table lookup test.

the DOS DEBUG utility, with some important differences. Devoid of all nicely descriptive labels and address names, a normal DEBUG listing is difficult for most people to follow. The code may look familiar, but a CALL 0E87 command doesn't tell you that your FATAL\_ER-

ROR subroutine is about to be executed.

To fully make use of the SYMDEB feature, you have to link with the map option, then run the MAPSYM utility to convert the map file to a symbol file that SYMDEB reads in with your program. It will then display procedures, groups, and labels

```

; TEST6.ASM -- Assembly Language Test Program 6 -- File Input/Output
;-----
; Charles Petzold, August 3, 1985
;
CSEG                Segment Public 'CODE'
Assume CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG
Extrn StartTime:Near, PrintTime:Near
Org 0050h

FileBuffer          Label Byte                ; Put buffer in PSP
Org 0100h
Entry:              Jmp Test6                  ; Skip over date
FileAsclz           db 'TEST.0AT',0           ; Name of File
FileHandle           dw 1                      ; File Handle
RecordSize           dw 132                   ; Record Size
ModifiedFile         db 'Modified',0          ; New File contents
ErrorMessage         db '--- File I/O Error -- $' ; All-purpose message
Test6:              Call StartTime            ; External Subroutine
Cld                 ; String Moves Forward
Mov 0x,Offset FileAsclz ; File name
Mov AL,2            ; Read / Write Access
Mov AH,3Ch           ; CREATE file Call
Int 21h              ; Do It
Jc Test6Error        ; Error Exit
Mov [FileHandle],AX  ; Otherwise save handle
Sub AX,AX            ; Record Count
Push AX              ; Save current record
Call LSEEK            ; Points file to record offset
Jc Test6Error        ; Error exit
Call WRITE            ; writes a 132 byte record
Jc Test6Error        ; Error exit
Pop AX               ; Get back current record
Inc AX               ; Up it by 1
Cmp AX,100           ; See if reached 100 yet
Jb WriteLoop         ; If not, keep going
Sub AX,AX             ; Phase 2 Record Count
Push AX              ; Save record count
Call LSEEK            ; Move pointer to record
Jc Test6Error        ; Error exit
Call READ             ; Read 132 byte record
Jc Test6Error        ; Error exit
Mov DI,Offset ModifiedFile ; Beginning of string to write
Mov SI,DI             ; Set SI to it also
Mov CX,[RecordSize]   ; Max characters in record
Sub AL,AL             ; Search for terminating zero
Repnz Scasd           ; Find it
Sub CX,[RecordSize]   ; Convert to string length
Not CX                ;
Mov 0i,Offset FileBuffer ; Destination is buffer
Rep Movsb             ; Move it in
Pop AX               ; Get record number again
Push AX              ;
Call LSEEK            ; Set pointer to record
Jc Test6Error        ; Error exit
Call WRITE            ; write the buffer
Jc Test6Error        ; Error exit
Pop AX               ; Record number
Inc AX               ; Increment it

; Continue if less than 100
Cmp AX,100
Jb ReadWriteLoop
Mov BX,[FileHandle]   ; Handle of file
Mov AH,3Fh            ; CLOSE file Call
Int 21h
Jnc Test6Exit
Mov 0i,Offset ErrorMessage ; Error exit
Mov AH,9
Int 21h
Call PrintTime        ; External Subroutine
Int 20h               ; Exit

```

(continues)

IBM Macro Assembler: File access test.

with their names as well as the normal address. Of course, in a single-module program, your map file is not going to have much information, but you can make all the important variables and routines public in the source file to get them listed and usable by SYMDEB.

SYMDEB has lots of other nice features, like dumping real variables in short, long, and 10-byte fashion. If you happen to have a dump terminal connected to the serial port of your computer, you can redirect SYMDEB input and output to the terminal so it doesn't interfere with the keyboard and screen workings of your program.

SYMDEB can also be used with other Microsoft language products, such as the C, FORTRAN, and Pascal compilers, for debugging at the source-code level. Any public address in linked-object modules or libraries is picked up by SYMDEB so you can trace through the inner workings of the compiled program.

SYMDEB is a nice little program, and the Microsoft Macro Assembler package is the only place you can get it. I bought this package for SYMDEB alone, and I'm glad I did.

If you go out and buy both the IBM and Microsoft assemblers, you'll probably use IBM's manual and Microsoft's program. The MASM.EXE programs are just about indistinguishable in operation, but the Microsoft program has a creation date 4 months later than IBM's. I use the Microsoft assembler under the assumption that something must have been fixed in those 4 months, even though I'm not quite sure what it is.

## Pasm86

Pasm86 is a recent entry in the professional macro assembler market from Phoenix Computer Products, the folks who write IBM-compatible ROM BIOS programs. Pasm86 is purportedly IBM- and Microsoft-compatible (except in that it has fewer bugs) and twice as fast. Is it? Well, almost and yes.

As advertised, Pasm86 is about twice as fast as the IBM and Microsoft assemblers for most programs. If you spend a lot of time staring at your screen while

(File access test continued)

```

; Subroutines for File I/O
; -----
LSEEK:      Mov     [RecordSize]    ; DX:AX = offset in bytes
            Mov     CX,DX
            Mov     DX,AX           ; CX:DX = offset in bytes
            Mov     BX,[FileHandle]
            Mov     AX,420Dh        ; Move from beginning of file
            Int     21h

READ:       Mov     AH,3Fh          ; Read Call
            Jmp     Short READWRITE

WRITE:      Mov     AH,4Dh          ; Write Call
            Jmp     Short READWRITE

READWRITE:  Mov     DX,Offset FileBuffer ; Buffer
            Mov     CX,[RecordSize]    ; Number of bytes
            Mov     BX,[FileHandle]    ; Handle
            Int     21h               ; Call DOS
            Jc      ReadWriteExit      ; Carry set if error
            Cmp     AX,CX              ; Also set if AX < CX
            Ret

ReadWriteExit: EndS
CSEG        End     Entry

```

MASM digests your program, you may want to look into this alternative. (You may also want to divide your program into multiple-object modules and start using libraries.) This increase in speed was not so evident in the standard test programs because they were all rather short and disk-access time predominates in assembling short programs. But for assembly language listings of five pages and up, the two-fold speed increase is real and impressive.

#### Compatibility?

Compatibility with IBM and Microsoft, however, is a problem. One of the first differences you'll notice is right on the command line. The .ASM filename cannot be followed by a semicolon, and all the parameter flags must be specified in UNIX fashion with a preceding dash instead of the normal DOS slash.

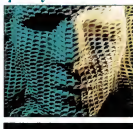
Another incompatibility showed up in the floating-point benchmark test. The floating-point multiply and divide test routines assumed that the numbers were stored in DD statements in BASIC (rather than 8087) format. The IBM and Microsoft assemblers can generate either format, with the BASIC format as the default. The Phoenix assembler used 8087 format and could not be switched to BASIC format. Thus, the floating-point routines had to be altered somewhat to work correctly when assembled by Pasm86.

For most programs, assembly under Pasm86 and linking under IBM's LINK program created files identical to those of the IBM or Microsoft assemblers. The in-

termediate .OBJ files were different, but this is of little consequence if LINK correctly translates them.

However, the Phoenix assembler had problems with several programs that I had written over the past few years and assembled under the IBM and Microsoft assemblers without difficulty. These problems

**W**hy program  
in assembly  
language? Power.  
You can do the most  
with it, and virtually  
anything you write  
will execute very  
quickly.



involved assembly language directives rather than instruction code. The Phoenix assembler is not compatible with IBM/Microsoft in some uses of the EXTRN command in multimodule programs and with

certain constructions using the ampersand (&) and percent sign (%) macro directives. Sometimes I found I could change something in order to make the program work under the Phoenix assembler that would make it impossible for the IBM and Microsoft assemblers to use. I'm not going to say that one version is wrong and one version is right, because programmers are often forced to discover by trial and error what will and will not work under a certain assembler or compiler if the manual is wrong or somewhat obscure on an issue. Somebody else who writes in assembly language may have a different interpretation. But just be aware that the Pasm86 assembler is not an IBM clone. It will probably be fine if you are beginning to program in assembly language but don't expect it to work flawlessly on all the programs you have already written.


Sometimes a program assembled without errors under the Pasm86 assembler but linked by LINK, Version 2.2 (delivered with DOS 3.1), said "DUP record too complex", a LINK message I had never gotten before. I suspect the message is a subtle advertisement to buy Phoenix's Plink86 program.

Phoenix's manual contains more information than the Microsoft manual, but it is not as complete or well printed as the IBM manual. The manual devotes at least one page each to all of the 8086/8088/80286 instructions and assembly language directives, but the 8087 instructions are not adequately documented.

If a faster, full-featured macro assembler is what you need, Phoenix Software has it. It's not fully compatible with IBM and Microsoft assemblers, but you will eventually adjust to the differences.

#### Conclusion

All three of these macro assemblers do just about the same thing. Despite the increased speed of the Phoenix assembler and some nice utilities included in the Microsoft package, the best of the three is the IBM Macro Assembler, Version 2.0. It is the best simply by virtue of its including something that even very experienced assembly language programmers must keep within arm's reach—an excellent reference manual. ■



# HOW TO COPE WITH THE INFORMATION EXPLOSION

If your job requires locating product reviews, financial data, company reports and other important information about the computer industry coming from hundreds of periodicals... you can now relax.

We've abstracted thousands of articles, organized them, indexed them and put them in one reference guide that will lead you to the right information *fast*.

We're **Data Sources COMPUTER INDUSTRY DIGEST**... the first and only definitive source of virtually every hardware and software product review printed in the English language. Abstracted, and indexed by manufacturer's name. Plus abstracts of articles reporting on the financial transactions of companies in the computer industry, including acquisitions, mergers, divestitures, earnings and financing.

It's published by **Data Sources**, the most comprehensive directory of computer products and companies.

It can save you hours of time, leg-work and frustration.

And best of all, it comes to you twice a year for the annual subscription price of only \$150—a savings of nearly \$50.00 off the regular price.

**Data Sources COMPUTER INDUSTRY DIGEST**. To subscribe, write to us today. And save yourself hours of time and trouble tomorrow.

T016

**DATA SOURCES**  
**COMPUTER INDUSTRY**  
**DIGEST**

ONE PARK AVENUE, 4TH FLOOR, NEW YORK, N.Y. 10016  
(212) 503-5395



# PASCAL





## PASCAL: This block-oriented, structured language is tailor-made for business programming, where getting the job done is more important than computer calisthenics.

**T**here are quite a number of reasons why I do all of my programming in Pascal, and one of them is APL.

Back in early 1976, when a useful personal computer was still prohibitively expensive, I had an account on an APL mainframe system. I had a canned application that I ran from time to time, but I also wanted to do some text processing for an in-house newsletter. I bought a good book on APL and spent some long evenings in front of the Diablo daisywheel terminal and soon found myself writing a text formatter.

It took several weeks to complete and ran to about 300 lines of APL code. APL, if you aren't familiar with it, uses Greek letters and unique symbols in an extremely terse notation. The formatter worked, after a fashion, and I used it for several months. Then, abruptly, my company sold its mainframe and started buying time on an APL time-sharing service. The new APL interpreter was similar, but not identical, to the old one, and my formatter didn't run on it. The new APL interpreter kept printing error messages and tossing me out on my ear. I suspected a little rewriting would get it running again.

I printed it out, looked at it, and realized with welling horror that I hadn't the slightest idea how my program worked. The code was literally Greek to me. No matter how hard I tried, I could not dope out the algorithm by looking at the code. I ended up abandoning the old formatter and writing a new one completely from scratch.

In hindsight, there were three reasons why I had to abandon my formatter. It was completely unstructured and existed as one block of 300 lines of code. APL permits nested functions, but my reference book did not emphasize them and explained them poorly.

Another reason was that the terseness of the APL notation encouraged me to cram a great deal of function onto a single line of code. My reference book said this ap-

proach would make my program run faster. Each line was a dense conglomeration of symbols that required laborious examination to understand.

To top it off, I had not had the discipline to plan and properly annotate my work, and nothing in the APL language encouraged me to do so. To the contrary, everything in APL encourages spontaneous, unstructured patching-together of operators and lines without forethought.



*For small-to-middling projects, there is only one compiler to choose: Borland International's Turbo Pascal. It is simple, inexpensive, lightning fast in operation, and bursts at the seams with its vast array of features and extensions. Programming will always take a certain amount of time, but in Turbo Pascal it doesn't take as much time as it used to—and that has made a world of difference.*

All in all, APL made for rapid program development and for programs that set like concrete into stone as soon as I put them aside for a week or two. When I bought my first real personal computer a few years later, I sniffed around for a language that would prevent this disaster from ever happening again. The language, of course, is Pascal.

### The Secret Is Structure

Pascal imposes discipline and readability on programmers because it is a block-oriented, structured language. A block is a series of statements between the key words BEGIN and END. A statement is a single program action, and while statements are often written one to a line, you can put several statements on one program line or spread a complicated statement across many program lines.

Pascal is called a structured language

because it is particular about where its different parts are placed. Constants must be declared first, followed by variables, followed by functions and procedures, followed by the block of statements that accomplish the program's work. The program must have a name, followed by constant and variable declarations (if any), followed by the actual block of program statements between the BEGIN and END words, followed by a period. Pascal's characteristic indented style is a typographical convention used only to improve program readability. A Pascal compiler is completely indifferent to the way the program is distributed across source-file lines.

Within a Pascal program there may be subprograms, called functions or procedures. Subprograms are miniature programs, identical to programs in nearly all respects. Subprograms can have their own private constants and variables or they can use those of the main program. Furthermore, subprograms can have their own private subprograms declared within them, and so on, like nested Chinese boxes.

### Straitjacket Effect

Apart from where you put certain parts of a program, Pascal has definite feelings about how different types of data are treated within the program. Integers and characters, for example, mean very different things, regardless of how they are stored in the computer. Adding a character to an integer makes no sense in Pascal, so the compiler simply won't allow it. It has well-defined ways of moving values from one data type to another in those specific cases where such transfers make logical sense. These are called "transfer functions," and they are a major force in keeping nonsense out of programs.

Open-ended concepts are verboten in Pascal. If you need an array of data items, you must tell the compiler how big it is as soon as you define it, and it can never grow larger or smaller than your definition

states. This restriction can keep you out of certain subtle and not-so-subtle trouble, like arrays accidentally overlapping in memory or arrays growing too large for memory to hold. (I should point out that most modern Pascal compilers have plenty of sneaky tricks to get around this and other restrictions. You don't have to use them—it is often difficult to use them—but they are there to get you out of bad spots if you need them.)

Many critics of Pascal cite these very points as its flaws: It is verbose, it puts the programmer into a straitjacket, and so on. Like so many things in life, it depends entirely on what you consider your priorities to be. If you mostly want to have a good time programming, Pascal takes a backseat to C and FORTH. But if retaining your investment in a piece of code over a long period of time is your primary goal, then what others call restrictions are only the enforcement of a necessary discipline—and the preservation of your investment of time.

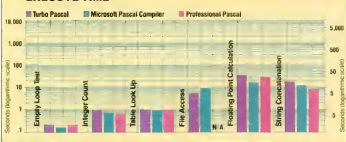
### Pascal's Uneasy Evolution

Like most distinctive languages, Pascal originated as the product of one mind: Niklaus Wirth, a Swiss professor of computer science. Pascal had some roots in an earlier language called Algol 60, but Pascal's characteristic features—its rigid program structures and emphasis on strict segregation of data by type—were largely original with Wirth. Wirth developed Pascal in the late sixties as a tool for teaching good programming practices to computer science students. The first Pascal compiler was made to work on a large mainframe computer in 1970.

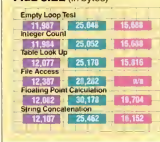
The language as Wirth defined it (which later became standard Pascal) was severely limited in many ways. It was not suitable for any kind of extensive interactive programming, and it certainly was not written with CRT displays in mind. CRT terminals were rare creatures indeed in 1970. It had very little file I/O and no provision for making calls to the operating system or otherwise operating computer peripherals. Wirth intended it to be used by students in batch mode on mainframes, and he strongly resisted the suggestion that the scope of the language be broadened to

## PASCAL

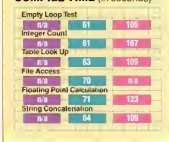
### EXECUTE TIME



### FILE SIZE (in bytes)



### COMPILE TIME (in seconds)



Benchmark test results for Turbo Pascal, Microsoft Pascal, and Professional Pascal. All tests were run on an IBM PC with a hard disk drive. All file sizes are listed in bytes; all times listed in seconds. Note: Pascal stores data tables in arrays only, so the table lookup test is included to show the speed with which Pascal reads from an array. Professional Pascal contains no built-in library function to perform file update-in-place, as required by the file access test. Turbo Pascal compiles instantaneously in the interpreter.

make it commercially useful.

Pascal, however, became very popular, first with university programmers and then with programmers in the business world. The inevitable happened, and the vendors who sold Pascal compilers commercially began to expand the features of the compilers they sold to please commercial program developers.

By the late seventies, there were microcomputer Pascals with random file I/O, graphics, operating system interfaces, and full-screen control for developing interactive applications. Wirth disavowed all of this, implied it was ruining the language, and promised a better solution. That solution, Wirth's new Modula 2 language, was announced in 1981. Modula 2 may, in

fact, be a better way to program than Pascal, but the language is in its infancy, and no significant Modula 2 compilers exist for the IBM PC.

Wirth's fears that "extending" the standard Pascal definition would create a myriad of different dialects of the language and destroy any hopes for portability have largely come true. On the other hand, the choice between a useful language and a portable one is an easy one to make, and the situation is certainly no worse than it is for any other high-level computer programming language. Finally, Pascal's readability (a feature burned into its structure by Wirth) makes "porting" programs from dialect to dialect easier in Pascal than in any other language.

## Pascal Compilers

Pascal compilers are difficult to write, harder still to document, and nearly impossible to market. Compilers have come and gone over the years, and most have met with little commercial success. In my view, there are only three Pascal compilers available today for the IBM PC that merit attention from business programmers: Microsoft's MS-Pascal, MetaWare's Professional Pascal, and Borland International's Turbo Pascal. IBM offers a Pascal compiler that is a private-label version of MS-Pascal, so I will not be dealing with IBM Pascal separately in this review. As IBM's private version is always several releases behind Microsoft's, there is little, if any, reason to buy it.

There is also a version of UCSD Pascal that is available for the IBM PC that can be used under Softech's P-System operating system, and if you are using the P-System, in all probability you simply have no other choice. While reasonably well docu-

mented, UCSD Pascal is a slow, primitive version of the language, and it is nowhere near as portable as the vendor claims it to be.

### MS-Pascal

Microsoft's MS-Pascal is a reasonably priced (\$300) and tremendously powerful Pascal compiler. It has some distant roots

**I**f you already know something about programming and are willing to probe, MS-Pascal could be your compiler of choice.

in UCSD Pascal, but in general, it is highly original and very well thought out. The code it produces is extraordinarily fast, if somewhat bulky, and the current version of the compiler (3.3) compiles very quickly when compared with its progenitors.

MS-Pascal supports overlays, the 8087/80287, and the 8086 large-memory model. It has the WORD and LONGINT data types, DOS call primitives, and a large number of extensions to the Pascal language. One interesting addition to the current release is file- and record-locking, a process useful only in multiuser or multitasking (two or more programs running at once) environments. Since multitasking environments such as TopView and Windows are beginning to appear, it is good to see that tools are available to make use of this power.



The most recent releases of all Micro-soft languages are link-compatible with one another. In other words, you can take routines compiled with MS-FORTRAN and link them into programs compiled with MS-Pascal. Many scientific and numeric algorithms have been published in FORTRAN, and this provides one way of making use of this material without writing exclusively in FORTRAN.

```
PROGRAM INTCOUNT;
VAR X : INTEGER;
($I SHOWTIME.SRC)
($I ZEROTIME.SRC)
BEGIN
  ZERO_TIME;
  X := 0;
  WHILE X < MAXINT DO X := X+1;
  SHOW_TIME;
END.
```

Turbo Pascal: Integer count test.

```
PROGRAM FLOATER;
VAR X : INTEGER;
    A, B, C : REAL;
($I SHOWTIME.SRC)
($I ZEROTIME.SRC)
BEGIN
  ZERO_TIME;
  FOR X := 0 TO 10000 DO
    BEGIN
      A:=0; B:=1234; C:=78.9;
      A:=B*C;
      A:=B/C;
    END;
  SHOW_TIME;
END.
```

Turbo Pascal: Floating point test.



**Turbo Pascal, Version 3.0**  
Borland International  
4585 Scotts Valley Dr.  
Scotts Valley, CA 95066  
(408) 438-8400  
**List Price:** \$69.95  
**Requires:** 128K RAM,  
DOS 2.x.

CIRCLE 671 ON READER SERVICE CARD



**Microsoft Pascal Compiler, Version 3.3**  
Microsoft Corp.  
10700 Northrup Way  
Bellevue, WA 98009  
(800) 426-9400  
**List Price:** \$300  
**Requires:** 256K RAM, two disk drives,  
DOS 2.x.

CIRCLE 670 ON READER SERVICE CARD



**Professional Pascal, Version 2.3**  
MetaWare Inc.  
412 Liberty St.  
Santa Cruz, CA 95060  
(408) 429-6382  
**List Price:** \$595  
**Requires:** 256K RAM, two disk drives,  
DOS 2.x.

CIRCLE 669 ON READER SERVICE CARD

The fundamental difficulty with MS-Pascal is that its awesome power tends to get in the way. This is especially true for people who are new to Pascal and attempting to learn the language by experimentation. The compiler has its own internal command set, called a *metalanguage* (meaning, literally, a "language about a language"), which is badly explained and often difficult for beginners to grasp.

Much of the difficulty stems from the documentation. While fairly complete, MS-Pascal's twin slipcase manuals are poorly organized and difficult to scan for needed information. Many necessary features (the DOS-call library function, for example) are not mentioned in the typeset documentation and are covered in an addendum tacked on to the end of the manual. Several evenings of intense study will be necessary before you can begin to do any serious work in MS-Pascal. You will probably need to read the manual for a good hour before compiling even the simplest program.

On the other hand, if you already know something about programming, and you are willing to probe and experiment and spend some considerable time and energy getting to know the compiler's labyrinthine ways, MS-Pascal could be your compiler of choice.

### Professional Pascal

MetaWare's Professional Pascal is by far the newest of the three compilers mentioned here, and, at \$595, it's certainly the most expensive. On the other hand, it could well be the most powerful Pascal compiler ever implemented on a micro-computer.

Professional Pascal is part of a larger

**U**sing Professional Pascal for small projects is shooting mosquitos with a howitzer, but if you must, the mosquitos don't have a chance.

family of assemblers, cross-assemblers, and cross-compilers (which allow a single version of a program to be developed on one machine and then cross-compiled to many other computers). Professional Pascal code generators are available for both DOS and the VAX/VMS operating environments, with other environments, including UNIX, still in development. Professional is one way to beat Pascal's portability problem, but it comes at a fairly high price: having to buy a separate \$595 compiler for each target machine you wish your program to run on.

The compiler has all the necessary features: 8087 support, overlays, interrupt support, and strings. There is no support for sound or graphics or any other IBM PC peripheral devices, but this is true of MS-Pascal and most versions of Turbo Pascal.

```

PROGRAM STRINGER;

VAR X      : INTEGER;
    A,B,C  : STRING[80];

{$I SHOWTIME.SRC}
{$I ZEROTIME.SRC}

BEGIN
  ZERO_TIME;
  FOR X := 0 TO 10000 DO
    BEGIN
      A := 'This is a string';
      B := 'This is a longer string with lots of words in it.';
      C := CONCAT(A,B)
    END;
  SHOW_TIME
END.

```

### Turbo Pascal: String concatenation test.

In preparing the current release, MetaWare went through MS-Pascal feature by feature, making sure that anything MS-Pascal could do, Professional Pascal could do. As far as I could determine, it was successful in meeting this standard.

Professional Pascal incorporates some of the philosophy of the Ada language specification, as well as some of its jargon: It uses *packages* to contain libraries of separately compiled modules and *pragmas* to issue commands to the compiler. (MS-Pascal calls such commands *metacommands*. What a pity we don't all speak a common tongue. . . .)

All 8086 memory models are supported. Memory models are ways of allocating machine memory to program data and code. Each model requires a separately compiled copy of all utility libraries, and, consequently, the Professional Pascal compiler is shipped on nine diskettes. The compiler and libraries for a single memory model require about 1.5 megabytes of disk storage. This compiler will not run on a floppy-based PC.

The compiler itself, in fact, occupies 566K bytes, and is too large to fit on a single disk. An installation program reads portions of it from two diskettes and assembles it into a single enormous program file on your hard disk. The installation program is excellent. It builds whatever subdirectories it needs and loads whatever files are necessary from the nine distribution diskettes, placing them in the appro-

```

PROGRAM EMPTYLOOP;

VAR I : INTEGER;

{$I SHOWTIME.SRC}
{$I ZEROTIME.SRC}

BEGIN
  ZERO_TIME;
  FOR I := 1 TO 10000 DO;
    SHOW_TIME;
  END.

```

### Turbo Pascal: Empty loop test.

prate subdirectories.

Professional Pascal is quite difficult to learn and use. The documentation, while better organized than MS-Pascal's, is in smaller, fuzzier print, so it is quite difficult to read. It is not complete; some libraries are documented only in the source files and are not mentioned in the manual at all. However, the documentation is Professional Pascal's only real weakness. The software itself performed beautifully, never once behaving in an unexpected fashion. The code it produces is tighter than MS-Pascal's and about as fast.

In a way, the difficulties I discovered working with Professional Pascal were not really the compiler's fault. It is an enormously complicated product, and it is not intended for the beginning or casual programmer, as you might expect from the rather stiff price tag. Professional Pascal's target buyers are people who develop software to be sold on the commercial market. Such people are generally familiar with

```

PROGRAM FILER;

TYPE STRING132 = STRING[132];

VAR X      : INTEGER;
    TESTER : FILE OF STRING132;
    DATA_STRING : STRING132;
    A_STRING  : STRING132;

{$I SHOWTIME.SRC}
{$I ZEROTIME.SRC}

BEGIN
    ZERO_TIME;
    A_STRING :=
    '
    DATA_STRING := A_STRING;
    DATA_STRING := CONCAT(DATA_STRING,A_STRING);
    ASSIGN(TESTER,'TEST.DAT'); { Create/open new file }
    REWRITE(TESTER);
    FOR X := 1 TO 100 DO { Write records to file }
    BEGIN
        SEEK(TESTER,X);
        WRITE(TESTER,DATA_STRING)
    END;
    CLOSE(TESTER); { Close file to flush buffer }
    RESET(TESTER); { Re-open file for read }
    FOR X := 1 TO 100 DO { Read records back from disk }
    BEGIN
        SEEK(TESTER,X);
        READ(TESTER,DATA_STRING);
    END;
    FOR X := 1 TO 100 DO { Read records, modify them, }
    BEGIN { and write them back out again }
        SEEK(TESTER,X);
        READ(TESTER,DATA_STRING);
        DATA_STRING := 'Modified!';
        SEEK(TESTER,X);
        WRITE(TESTER,DATA_STRING)
    END;
    CLOSE(TESTER);
    SHOW_TIME
END.

```

**Turbo Pascal: File access test.**

```

PROGRAM TABLER;

VAR X,A,LOOP : INTEGER;
    INT_ARRAY : ARRAY[1..25] OF INTEGER;

{$I SHOWTIME.SRC}
{$I ZEROTIME.SRC}

BEGIN
    ZERO_TIME;
    FOR X := 1 TO 25 DO INT_ARRAY[X] := X; {Fill the array}
    FOR X := 1 TO 1000 DO
        FOR LOOP := 1 TO 25 DO A := INT_ARRAY[LOOP];
    SHOW_TIME;
END.

```

**Turbo Pascal: Table lookup test.**

compilers, separate compilation, and all the other myriad details that must be understood to bring a commercial package to market. Using this program for small projects is definitely shooting mosquitos with a howitzer, but if you must, well, the mosquitos don't have a chance.

### Turbo Pascal

MS-Pascal and Professional Pascal are similar in the way they operate: You edit a source-code file with a separate text editor, compile the source-code file to a linkable object-code file with the compiler itself, and then link the object-code file together with one or more utility libraries to pro-

**T**urbo Pascal bundles a good text editor, fast compiler, and certain debugging facilities into a single package occupying only 36K bytes of disk space.

duce a runnable .EXE file. This process involves a good deal of reading from and writing to disks, and a whole edit/compile/link cycle rarely takes less than 5 to 7 minutes.

In 1983, Borland International released a new kind of Pascal compiler that allowed a complete edit/compile cycle (it eliminated the link step) to take as little as 15 to 20 seconds for short programs. This remarkable product, Turbo Pascal, bundled a good text editor, fast compiler, and certain debugging facilities into a single package occupying only 36K bytes of disk space. Professional Pascal, by contrast, requires more than 1.5 megabytes of hard disk storage to operate.

Turbo Pascal obtains much of its speed edge by setting up an "environment" in memory that contains the compiler, the editor, plus both your source program and

# Fascinating

✓ denotes IBM-AT compatibility.

## SOURCE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

<b>Alpha Software</b>	
✓Keyworks	\$49
✓Electric Desk 1.04	195
✓Data Base Manager II 2.02	169
<b>Aptec</b>	
✓Rainbow Writer Color Text Formatter 2.1	\$119
✓Rainbow Writer Screen Grabber 1.1	69
✓ColorScreenPrint 2.0	59
<b>Ashton-Tate</b>	
✓dBase III 1.1	call
✓Framework 1.1	call
<b>Best Programs</b>	
✓PC Fixed Asset System 3.0	329
✓PC Tax Cut (for 1984 taxes)	49
✓PC Personnel (Level 2) 3.0	419
<b>Bible Research</b>	
✓THE WORD 3.0 (KJV Bible)	145
✓THE WORD 3.0 (NIV Bible)	145
<b>Borland International</b>	
✓Sidekick 1.5 (non-patched)	48
✓Turbo Pascal 3.0	37
✓Turbo Pascal 3.0 w/BCD	59
✓Turbo 8087 3.0	59
✓Turbo 8087 3.0 w/BCD	72
✓Turbo Database Toolbox 1.0	30
✓Graphics Toolbox 1.0	30
✓Turbo Tutor 1.0	19
✓Superkey 1.0	37
<b>Breakthrough</b>	
✓Timeline 2.0	special
<b>Broderbund</b>	
✓Bank Street Writer	49
<b>Connecticut Software</b>	
✓Printer Boss 5.0	99
✓Sideline 5.0 (more features than Sideways)	37
<b>Digital Research</b>	
✓GEM Desktop 1.1	30
✓GEM Draw 1.0 (includes GEM Desktop)	93
<b>FriendlySoft</b>	
✓FriendlyWriter 2.0 (with FriendlySpeller)	55
<b>Funk Software</b>	
✓Sideways 2.11	37
<b>Harvard Total</b>	
✓Harvard Total Project Manager 1.0	279
<b>Hayes</b>	
✓SmartCom II 2.1	89
<b>IMS!</b>	
✓PC Paintbrush 2.8	69
<b>Infocom</b>	
✓Comstone 1.0	279
<b>Lifetree</b>	
✓Livingwriter Deluxe 2.2 (with TextMerge)	159
<b>Visual Videotext</b>	
✓ThinkTank 2.0	109
<b>Micro Education (MECA)</b>	
✓Managing Your Money 1.52	99
✓Running Program (Jim Fox) 1.2	49

## PC Connection Software Special

through October 31, 1985

### BREAKTHROUGH

#### ✓Timeline version 2.0

- The most popular project management software on the market
  - Powerful, flexible, easy to use
  - Unlimited number of tasks, dependencies, resources, and cost categories
  - Exports directly to 1-2-3, Symphony, Multiplan, dBase II and III, and others
- Works with PC, XT, AT, 3270PC \$249

### Micropro

✓WordStar 3.31 \$179

Hard disk recommended for Wordstar 2000 & Wordstar 2000 Plus

✓WordStar 2000 1.01 259

✓WordStar 2000 Plus 1.01 299

### Microrim

✓R-base 5000 1.0 369

✓Extended Report Writer 1.2 85

✓Clout 2.0 135

### Microsoft

✓Multiplan 1.2 125

✓Microsoft Spell 1.0 30

✓Microsoft Word 2.0 235

Both of the following Microsoft mice now come with PC Paintbrush software

✓Microsoft Mouse with software 4.0 135

✓Microsoft Serial Mouse with software 4.0 135

✓Microsoft Project 1.01 155

✓Microsoft Chart 1.01 155

### Microstat

✓Crosstalk XVI 3.5 99

✓Transporter 1.3 (includes Crosstalk) 169

### Multimate International

✓MultiMate 3.31 call

✓MultiMate Advantage 3.5 call

### Peter Norton

✓Norton Utilities 3.0 59

### Powerbase Systems

✓Powerbase 2.1 239

### Rossoft

✓Prokey 4.0 89

### Satellite Software

✓WordPerfect 4.0 239

### Software Digest

Ratings Newsletter

This publication is unparalleled for its comprehensive, reliable evaluations. 1985's issues evaluate the following programs: word processors, file mgt., database mgt., spreadsheets, graphics, integrated accounting, project mgt., communications, integrated productivity.

Single copy 18 50

Year subscription 185 00

## Software Group

✓Enable 1.1 \$319

## Software Publishing

✓PFS File B.01 84

✓PFS Graph B.01 84

✓PFS Plan A.01 84

✓PFS Profit B.00 59

✓PFS Report B.01 77

✓PFS Write B.01 84

## Virtual Combinatics

Micro Cookbook 29

## Warner Software

✓The Desk Organizer 2.0 69

## TRAINING

### ATI

#### SKILL BUILDER PROGRAMS

Intro and How To Use

Word Processing MS-DOS

Business Software PC-DOS

Data Bases Home Accountant

Compaq VW Deluxe

IBM-PC BASIC

Typing Tutor each 32

#### TRAINING POWER PROGRAMS

How to Use

dBase II dBaseIII Lotus 1-2-3

MS Word Easywriter II Multimate

Multiplan Supercalc 3 Framework

Symphony Wordstar TKISolver

each 49

✓Survival Kit (includes Intro to the PC, Intro to PC-DOS, & Intro to Business Software) 79

## Individual Software

✓The Instructor II 35

✓Professor DOS 47

✓Tutorial Set (both items above) 75

✓Professor Pixel 47

✓Typing Instructor 39

✓Training for Lotus 1-2-3 49

## Scarborough Systems

MasterType 35

## Simon & Schuster

Typing Tutor III 33

## EDUCATIONAL

### Barron's

Computer SAT 59.

### Designware

Spellcopter (ages 6 to adult) 25

Mission Algebra (ages 13 and up) 27

### Digital Research

Diagnostic Test (PSAT) 14

OwlCat SAT (15 hours) 63

OwlCat SAT (60 hours) 169.

### Harcourt Brace Jovanovich

Computer SAT 49

### Spinnaker

Educational Games for Young Computer Users (All require graphics board)

Delta Drawing (ages 4 to adult) 27

President's Choice (ages 13 to adult) 27

Snooper Troops I (ages 10 to adult) 23

\* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE WARRANTIES UP TO FIVE YEARS. COPYRIGHT MICRO CONNECTION, INC. 1985. ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

✓ CONNECTION AND PC CONNECTION ARE REGISTERED TRADEMARKS, AND MICRO CONNECTION IS A TRADEMARK OF MICRO CONNECTION, INC. MARLOW, NH

# PC-CONNECTION®



# PC Pilgrim.

## Feast or famine.

Many moons ago, a small band of pioneers fled from the persecution of high prices, and established a foothold in the uncharted waters of IBM-PC add-ons and software. They settled on the banks of the Ashuelot River in the remote outpost of Marlow, NH (present pop. 548).

They faced many hardships, these early mail-order pioneers. Especially during that first winter, when there was little food, less heat, and even fewer orders. But, thanks to their own indomitable spirit and the support of the native intelligent population (pictured above), our heroes survived and thrived.

## Kernels of truth. Or, let's talk turnkey.

And so, every year, thousands of PC owners give thanks for our rich harvest of savings, and bumper crop of service and support. Oh, there have been attacks on our humble way of doing business—

from insidious innuendo and bogus braggadocio, to outright offenses against our complex supply lines. But our customers, true believers all, have returned to us again and again as an exemplar of execution in a somewhat slipshod world.

Because if you own an IBM-PC (PCjr, XT, AT) we can help you assemble the entire system you need, from soup to nuts. At what, even we admit, are rather ungodly savings.



The PC Connection cap and scarf, featuring our very own native American mascot. Offer available to customers of every race, color, and/or creed—but not to commercial accounts. Limit one per customer.

## The ultimate snow job.

Now when you buy from PC Connection you can really feel warm all over. Because we're giving away a free New England survival cap and scarf to everyone who places a \$500 order between now and December 31.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit, call ahead to make sure what you want is in stock. The showroom closes at 8:00 M-F and at 5:00 on Saturday.

For the IBM-PC (XT & AT) exclusively.

# PC CONNECTION



# ment.

FX-85 (replaces FX-80 +)	call
FX-185 (replaces FX-100 +)	call
JX-80	call
LQ-1500 (letter quality dot matrix)	call
Printer to IBM Cable (specify printer)	19
<b>Heyes</b>	
Smartmodem 300	149
Smartmodem 1200	399
Smartmodem 1200B (w/Smartcom II)	369
Smartmodem 2400	599
Smartcom II 2.1 (software)	89
Curts' Smartmodem-to-IBM Cable	19
<b>Hercules</b>	
Hercules Graphics Card (parallel port)	309
Hercules Color Card (parallel port)	169
Graph-X Software 2.0	42
<b>IMI</b>	
PC Mouse w/PC Paintbrush 2.8	special
<b>Kensington Microware</b>	
Masterpiece	94
Printer/portable computer stand	17.
<b>keytronic</b>	
Deluxe keyboard (KB 5151)	169
AT Converter (makes 5151 keyboards work with AT)	12
<b>Kraft</b>	
Joystick	35
<b>Mouse Systems</b>	
PC Mouse (w software pad & PC Pant)	139
<b>Orchid Technologies</b>	
Alt Orchid Boards come with PCNet Drive (Ram disk), PCNet spool (print spooling) disk caching & partitioning	
Blossom 64k, upgradeable to 384k, with clock calendar, serial and parallel ports	199
PCNet Daughter Board (piggybacks to Blossom) with version 3.0 networking software	call
PCNet Blossom 64k Blossom Board with the Daughter Board installed	call
PC Turbo 186 w 128k	call
PC Net (stand alone card)	call
<b>Paradise Systems</b>	
Modular Graphics Card	275
Multidisplay Card	195
5-Pack (2K expandable to 384k) w clock and serial port	169
<b>Princeton Graphics</b>	
10-12 RGB monitor (690 x 240)	call
MAX-12E Amber monochrome monitor	call
SR-12 RGB Monitor (690 x 480)	call
Scan II Board for SR-12	call
<b>Quadram</b>	
Expanded Quadboard with clock calendar, parallel serial & game port I/O bracket, and Quadmaster software	
64k upgradeable to 384k	199
384k (fully populated)	239
Microtizer Printer Buffer (parallel) w/copy	159
MP 64 (64k) upgradeable to 512k	197
Quadcolor I	197
Quadchrome RGB Monitor	469
<b>SMA (Systems Management)</b>	
PC-Document Keyboard Templates available for	
DOS/Basic 1.1	Supercalc 3
DOS/Basic 2.0-2.1	Wordstar

DOS/Basic 3.0-3.1	Wordstar 2000
Lotus 1-2-3	Turbo Pascal
Symphony	WordPerfect
Multiphan (IBM)	dBase III
Multiphan (Microsoft)	dBase III
Framework	dMataite
Volkswriter Deluxe	each \$12
<b>Telligraze Technology</b>	
TG 5025—25 meg hard drive w/controller	
and 60 meg backup unit	call
<b>Tohiba</b>	
P351 printer	1129
P1340 printer	569
<b>WICO</b>	
Joystick	35

## DRIVES

All floppy drives are completely pre-tested and are supplied with a printout of the test results. They are shipped with complete step-by-step installation instructions. Drives are 320k/360k

<b>Control Data (CDC)</b>	
(5 1/4") half-height drive (DS,DD)	89
Free mounting bracket with each pair of half-heights	
<b>IONEGA</b>	
Bermouli Box 20 Meg	2397
10 Meg cartridge	48
<b>Tandon</b>	
TM 100-2 (5 1/4") full-height drive (DS,DD)	109
10 Meg Internal hard drive w/controller (complete package)	439
<b>TEAC</b>	
FD-55B (5 1/4") half-height drive (DS,DD)	95
Free mounting bracket with each pair of half-heights	

## MEMORY

64k Memory Upgrade Set for IBM-PC or XT system board (9 chips)	\$8
64k Memory Upgrade Set for any memory board specify make of board (9 chips)	8
Install memory upgrades & run diagnostics at time of board purchase only	10
256k Memory Upgrade Set for any IBM-AT memory board (9 chips)	39
128k Memory Upgrade Set for IBM-AT System Board (18 chips piggybacked)	39

## DISKS

<b>Fuji</b>	
Disks for IBM-AT (96-TPI) Box of 10	39
<b>MAXELL</b>	
Disks for IBM-AT (96-TPI) Box of 10	45
<b>Verbatim</b>	
Datallite Disks SS/DD Box of 10	21
Datallite Disks DS/DD Box of 10	25
Disks for IBM-AT (96-TPI) Box of 10	47
<b>Flip Sort</b> (holds 75 disks)	15

## INFORMATION SERVICES

<b>Compuserve</b>	
Compuserve Information Service (includes subscription, manual, 5 hours of connect time, monthly publications)	19
<b>Source Telecomputing</b>	
The Source (subscription & manual)	39

## 2nd Disk Drive for junior.

At JR. CONNECTION® we keep on finding new ways to give your PCjr. the versatility of the bigger machines.

This month we're offering the JR. CONNECTION 2nd Disk Drive Package for just \$197. The package consists of an external drive, with power supply and drive case, and Creative Firmware's Drive IIA Adapter Card—everything you need to have your very own second drive.

And, if you've been looking wistfully at all those fancy integrated software packages designed for IBM-PC, you'll be pleased to hear we are now selling

Electric Deskjet from Alpha Software for only \$129. This easy-to-use program gives you word processing, database, spreadsheet, and communications capabilities. All you need is 128k and one disk drive. The package comes with 2 cartridges, 1 program disk, and a tutorial.

An external drive package for under \$200! An integrated software program for way under \$150! That's right. And we have much more. Call 1-800/IBM-jrPC or 603/446-7761 for our special PCjr pricelist or to place an order.

**1-800/IBM-jr PC**  
**Monday-Saturday 9:00-5:30**

150MJ

CIRCLE 39 ON READER SERVICE CARD

# PC-CONNECTION®

Folded edge of the page



Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
  1. Front side touching the free page
  2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Open the foldout page
2. Insert this sheet with
  1. Front side touching the free page
  2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



Gbt5fpBack-0018

Back

1. Follow instructions on the other side

# facts, fantastic full

Most Amazing Thing (ages 10 & up)	\$23
Alphabet Zoo (ages 3 to 8)	20
Face Maker (ages 3 to 8)	18
Kids on Keys (ages 3 to 9)	18
Fraction Fever (ages 7 to adult)	18
Kinder Comp (ages 3 to 8)	18
<b>Springboard</b>	
Early Games for Young Children (ages 2 1/2 to 6)	22
<b>Stone</b> (requires graphics board)	
My Letters, Numbers, Words (ages 1 to 5)	29
Kids Stuff (ages 3 to 8)	29
Across the U.S.A. (ages 5 and up)	22
<b>The Learning Company</b>	
Magic Spells (ages 6 to 10)	23
Word Spinner (ages 6 to 10)	23

## GAMES

<b>Blue Chip</b>	
Millionaire	32
Tycoon	32
Baron	32
<b>Broderbund</b>	
Lode Runner	25
<b>FriendlySoft</b>	
FriendlyWare/PC Arcade	35
<b>Hayden Software</b>	
Sargon III	35
<i>Infocom Difficulty levels shown in italics</i>	
Seastalker (junior)	25
Enchanter (standard)	25
the Witness (standard)	25
Planetfall (standard)	25
Cuthroat (standard)	25
Hitchhiker's Guide (standard)	25
Zork I (standard)	25
Zork II (advanced)	29
Zork III (advanced)	29
Infidel (advanced)	29
Sorcerer (advanced)	29
Suspect (advanced)	29
Deadline (expert)	31
Starcross (expert)	31
Suspended (expert)	31
<i>Invisives (hint booklets) are available for most Infocom games. Specify game.</i>	
<b>Microsoft</b>	
Flight Simulator 2 12 (now works with Hercules Mono Card)	32
<b>Origin Systems</b>	
Ultima III	39
<b>Parlor Software</b>	
Bridge Parlor	49
<b>PCSoftware</b>	
Armchair Quarterback	27
Chess 2001	27
Championship Blackjack	23
<b>Professional Software</b>	
Trivia Fever	22
<b>Sir-Tech</b>	
Wizardry	42
<b>Spectrum Holobyte</b>	
GATO	27
<b>Sublogic</b>	
Night Mission Pinball	29
Jet	33

## PC Connection Hardware Special

through October 31, 1985

### IMS!

#### PC Mouse w/PC Paintbrush

- 3-button optical mouse made by Mouse Systems
- Includes PC Paintbrush software version 2.8
- Features Designer Pop-up menu software
- Connects to serial port

Works with PC, XT and AT

\$109

## HARDWARE

### AST Research (For IBM-PC, XT or AT)

All AST Boards come with SuperDrive, SuperSpool, and one year warranty. **SixPackPlus 64k**, upgradeable to 384k, with clock calendar, serial and parallel ports & now includes Borland Sidekick version 1.5 (non-copy protected) game port optional 229 384k (fully populated) 269

**MegaPlus II 64k**, upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel, game, or second serial port optional) 249

**MegaPak 128k** (not upgradeable) 159

**MegaPak 256k** 249

**IO Plus II** with clock calendar and serial port (parallel, game, or second serial port optional) 125

**Parallel, Game, or second Serial Port** for any AST board (specify board) 35

**Connectall** connector bracket (PC only) 19

**AST-5251-11** 597

**AST-3780** 589

**Reach Modern** (half card 300/1200 baud internal modem includes Crosstalk XVI) 389

**Advantage 128k** upgradeable to 1.5 Meg (more with Piggyback Card), with clock calendar, serial and parallel ports game port optional 399

**Amdak**

**Video 300G monitor** (green) 139

**Video 300A monitor** (amber) 149

**Video 310A monitor** (amber) 179

**Color 600 - RGB monitor** 399

**Compatible**

**Plastic Keyboard & Drive Cover Set** 17

**IBM Mono Screen Enhancement** 17

**Curtis**

**ACCESSORIES**

**PC Pedestal** (for IBM Mono or Color) 37

**PGS or Quadchrome Adapter** for above 9

**Low Profile Tilt and Swivel Pedestal** 37

**AD-2 Adapter for Portables** 15

**System Stand** 19

**System Stand for IBM-AT** 37

**Static Mat** 27

**Crystal 300-watt** (line conditioner) 159

**CABLES**

**Extension Cables** for IBM Mono Display 33

**Keyboard Extension Cable** (3 to 9 feet) 27

**AC Plug Adapter** (any monitor to your PC) 8

**Printer to IBM Cable** (specify printer) 19

**Smartmodem** to IBM Cable 19

**SURGE SUPPRESSORS**

All surge suppressors have an on/off switch

**Diamond** (6 outlets) 32

**Emerald** (6 outlets, 6 ft cord) 39

**Sapphire** (3 outlets, EMI/RFI filtered) 52

**Ruby** (6 outlets, EMI/RFI filtered, 6 ft cord) 59

**Epson**

All Epson printers have built in graphics capability. In addition, the LX80, FX85, and FX185 can all print in near letter quality (NLQ)

**LX-80** call

**DX-20** (letter quality) call

## OUR POLICY

- We accept VISA and MASTERCARD
- No surcharge added for charge cards
- Your card is not charged until we ship
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order
- No sales tax
- All shipments insured; no additional charge
- Allow 1 week for personal and company checks to clear
- UPS Next-Day-Air available
- COD max \$1000 Cash or certified check
- 120 day guarantee on all products \*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30

You can call our business offices at 603/446-3383 Monday thru Friday 9:00 to 5:30

## SHIPPING

**Continental US:** For monitors, printers, and drives, add 2% for UPS ground shipping. Call for UPS Blue or UPS Next-Day-Air. For all other items, add \$2 per order to cover UPS shipping. We will automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.

**Hawaii:** For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$2 per order. **Alaska and Outside Continental US:** Call 603/446-3383 for information.

# 1-800/243-8088

## PC Connection

6 Mill St., Marlow, NH 03456  
603/446-3383

150M

For the IBM-PC Exclusively.

# PC-CONNECTION®

object code. Nothing must be read in from disk to edit, compile, or run a program. Everything remains in memory until you explicitly choose to save something on disk. Editing scrolls the screen without delay and compiling takes place in seconds. Movement from one feature to another is instantaneous, since all features exist concurrently in memory.

## Loaded with Features

In richness of features, Turbo Pascal is fairly bursting at the seams. It includes full-screen control, elementary graphics, sound, DOS calls, interrupt calls, full pathname support, strings, and a host of minor but very useful extensions to Standard Pascal. Borland offers even more features as "toolbox" utility libraries. Turbo Pascal was originally offered for \$49.95, and in its third major release, the price has increased only \$20.

A special version of the program is available that uses the 8087/80287 math coprocessor chip, and yet another version offers high-precision BCD or "financial" real numbers. Turbo has always been available on a large number of operating systems and computers, including Z80, CP/M-80, CP/M-86, and PC/MS-DOS. More than 300,000 copies have been sold, far more than all other Pascal compilers put together.

Turbo Pascal's major virtue is simplicity. It has a strong visual orientation and a very clean design. Commands are single keystrokes; the several menus are uncluttered and self-explanatory. Its reference manual is an order of magnitude better than that of MS or Professional Pascal's, at least in part because there is less complication to explain.

## The Great Compromise

To achieve its simplicity, the designers of Turbo Pascal made an important compromise: They optimized Turbo Pascal as a fast development tool for short-to-mid-length programs 5,000 lines of code and smaller. Longer programs will not fit in memory and must be read from disk as they are compiled. Still-longer programs will not compile to less than Turbo's maximum file size of 64K bytes and must be cut up into overlays.

Since Turbo Pascal does not do separate compilation, it doesn't need a linker or a link step to produce executable programs. The drawback is that without a linker to bring in already-compiled subprograms from a library, Turbo must recompile the entire program each time you compile it to test a new piece. Even if 3,000 lines' worth of subprograms are completely solid and debugged, you must

**I**n Pascal, you can write a piece of code, pick it up a year from now, and know at a glance what it does.



still wait for them to compile while you work on the remaining code. In other Pascal compilers that can link library subprograms into the final executable program file, the link operation does take time. The break-even point between time lost to linking under ordinary compilers and time lost to compiling fully developed code under Turbo Pascal is about 6,000 to 7,000 lines. After that point, you come out ahead with separate compilation.

But for programs smaller than about 5,000 lines there is nothing to equal Turbo Pascal. Nothing even comes close. There are minor lapses in the language, the worst of which is probably the lack of a 32-bit "long integer." That and the inability to compile from batch mode and the fact that the compiler pauses after each error encountered in your source file are the major

complaints against Turbo.

These problems once again point to Turbo Pascal's specialty: developing short and fairly simple programs in a hurry. The machine code produced by Turbo Pascal is at least as good as that produced by the \$595 Professional Pascal and better in many ways than the code generated by MS-Pascal. Turbo's executable files are virtually always smaller than those produced by MS-Pascal using similar source code. Experts in compilers point to an awkward code generator in MS-Pascal as the reason.

The ultimate advantage of Turbo Pascal lies in sheer numbers. Lots of people are using the program: Magazines publish articles about it, there is a vigorous user group devoted to it, and third-party vendors are bringing out numerous add-in products for it. Borland's support for the product (by telephone and CompuServe) is legendary, belying the contention of some vendors that low-priced products cannot be supported at a profit.

## Conclusion

There are languages that require less "waiting around" than Pascal, like BASIC. Certainly, once you get beyond Turbo Pascal, Pascal compilers are not inexpensive. But when you balance speed of development against the cost of losing code to unreadability, Pascal clearly comes out ahead.

For small-to-middling projects, there is only one compiler to choose: Turbo Pascal. You will, if you work in Pascal long enough, grow beyond Turbo's limitations, in which case MS-Pascal will serve you well until you have grown well beyond the capabilities of the IBM PC. Professional Pascal is really for professional software developers rather than businesspeople; its price and complexity make it impractical for moderate, in-house projects.

Overall, Pascal is tailor-made for business programming, where getting the job done well is more important than computer calisthenics. Its restrictions and structure should be looked upon as guides rather than barriers, guides toward the goal of keeping your software creations available and malleable as long as you require them. ■

# Compare the Hercules™ Color Card to IBM's.

**Five reasons why the Hercules Color Card is better.**



**IBM Color Adapter \$244**



**Hercules Color Card \$245**

- |                  |  |   |
|------------------|--|---|
| 1. Compatibility | Runs hundreds of graphics programs.              | Runs the same hundreds of graphics programs. "The Hercules Color Card is so nearly identical to the IBM Color/ Graphics Card that it's almost uncanny." PC Mag. |
| 2. Printer port. | None.  | Standard. Our parallel port allows you to hook up to any IBM compatible printer.  |
| 3. Size.         | 13.25 inches. Limited to long slots.             | 5.25 inches. Fits in a long or short slot in a PC, XT, AT or <i>Portable</i> .  |
| 4. Flexibility.  | Can't always work with a Hercules Graphics Card. | Always works with a Hercules Graphics Card by means of a software switch.   |
| 5. Warranty.     | 90 days.   | Two years.  |

Any one of these five features is enough reason to buy a Hercules Color Card. But perhaps the most convincing reason of all is just how easy the Hercules Color Card is to use: "Right out of the box, the Hercules Color Card goes into an empty expansion slot, ready for you to plug in... and go to work—no jumpers, no software. For most applications, it's just that easy." PC Magazine.

Call 1-800-532-0600 Ext. 420 for the name of the Hercules dealer nearest you and we'll rush you our free info kit.

**Hercules.**  
We're strong on graphics.





## C: This language produces such tight code that it could have been named for the word "compact." Here's a look at four versions of high-performance, low-overhead C.

If it weren't for C, many of the best DOS programs might never have been written. Although some personal computer software is written in other languages, more and more high-performance software is written in C because it is efficient—for both the machine and the programmer.

C is an ideal language for a small computer like the IBM PC because it was developed as a low-overhead, high-yield language for "power-programmers." C gives the programmer complete freedom, and that freedom can produce responsive, useful software or it can be abused, bearing buggy, hard-to-understand software sludge.

C was developed in the early 1970s by Dennis Ritchie, a noted computer scientist at Bell Laboratories. As you might expect from its name, C is an extension of the computer language B, which itself evolved from a once-popular language called BCPL. C was developed so that Ritchie and his coworker, Ken Thompson (the original developer of UNIX), could more easily support and maintain UNIX on a variety of host computers. C, then, was designed to allow gifted programmers complete control of the machine. The C philosophy has proven to be so popular that the language is now widely used throughout the world on a wide variety of computers.

There are more versions of C for the IBM PC than any other language. At last count, there were more than a dozen compilers, at least four interpreters, and dozens of add-on packages. Yet all of this availability is for a relatively small market, at least compared with the size of the market for spreadsheets or word processors. Actually, C's great availability is one of the greatest strengths of the PC. A low-budget software entrepreneur can afford the same programming tool that is used by established firms such as Microsoft or Ashton-Tate.

In the past, C's popularity has been dampened by its steep learning curve. Doing simple things in C is easy, but mastery of the language is very difficult. C programs can be very obscure, and there are many ways to create subtle bugs that would normally be prevented in "safer" languages. Although C was primarily designed for professional programmers, it can be used productively by the less sophisticated if it is approached cautiously. C demands a greater investment on the part

you want one C vendor for projects on several different machines. Another unique compiler is Mark Williams's MWC86, which comes with a useful interactive debugger named CSD.

Choosing a few products to review from the large group of good C products was very difficult indeed. In the end I decided to review an old champion, a fresh contender, and two coaches (interpreters). There are many excellent products that are not reviewed here, and you should make a careful study before making a sizable investment in C.

Traditionally, C software development has been a three-step process: The source program was modified, then it was compiled (translated from source to machine language), and then it was tested. This traditional approach is exemplified by Lattice C, the current champion in the C arena. Until recently, Lattice was sold by Microsoft under the Microsoft name as well as under its own name. Now Microsoft is selling its own compiler, and the performance and completeness of the new Microsoft C makes it a strong contender for the honors (and rewards) of being the best C compiler for the PC.

Unfortunately, the modify-compile-test cycle can be painfully slow on a small computer because large programs (text editors and compilers) have to be loaded in from disk. So just as the business world is turning to integrated packages to make it easier to jump from spreadsheet to word processor, the programming world is realizing the advantages of "integrated" program-development systems. The two revolutionary interpreters reviewed here are Instant-C from Rational Systems and Run/C from Lifeboat Associates. Each of these products consists of a simple editor and a means of executing C programs. Both of these systems reduce the modify-compile time lags to zero, which allows the programmer to concentrate instead on testing.



*Of the true C compilers PC Magazine's editors prefer Microsoft C. Its code is compact; its library, unusually complete; and its documentation, exceptional. What's more, it offers complete support for the PC's memory models and numerics coprocessor. But for the sheer pleasure of programming in C without the nuisance of compilation, the product of choice is Instant-C—it gives you instant gratification.*

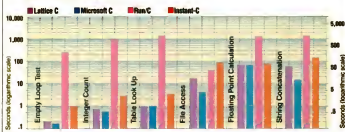
of the programmer than easier languages such as BASIC.

### The C Standard

Currently, the C standard is set forth in the classic C reference *The C Programming Language*, by Brian Kernighan and Dennis Ritchie, C's inventor. My favorite introductory C text is *Learning to Program in C* by Thomas Plum, and a good advanced book on C is *C: A Reference Manual*, by Harbison and Steele.

There are several notable C programming systems for the PC. First you must identify your needs, and then you can choose the system that is best for you. For example, the Aztec system runs on several machines, including the IBM PC and the Apple Macintosh, and it includes several useful utilities. It might be a good choice if

## EXECUTE TIME



## FILE SIZE (in bytes)

Empty Loop Test	10,344	7,022	n/a	n/a
Integer Count	10,342	7,006	n/a	n/a
Table Look Up	10,408	7,072	n/a	n/a
File Access	11,246	9,946	n/a	n/a
Floating Point Calculation	12,158	19,754	n/a	n/a
String Concatenation	10,714	7,202	n/a	n/a

## COMPILE TIME (in seconds)

Empty Loop Test	39	41	n/a	n/a
Integer Count	41	30	n/a	n/a
Table Look Up	43	40	n/a	n/a
File Access	51	52	n/a	n/a
Floating Point Calculation	48	49	n/a	n/a
String Concatenation	45	42	n/a	n/a

Benchmark test results for Lattice C, Microsoft C, Run/C, and Instant-C. All tests were run on an IBM PC with two floppy disk drives. All file sizes are listed in bytes, all times listed in seconds. Note: Run/C and Instant-C are interpreters and thus do not produce object code and do not have compile times.

```
#include <time.h>

main()
{
    long t;

    time(&t);
    puts(ctime(&t));

    for (i=1; i<=10000; i++)
    {
        time(&t);
        puts(ctime(&t));
    }
}
```

Microsoft C: Empty loop test.

```
main()
{
    int i;
    long t;

    time(&t);
    puts(ctime(&t));

    i = 0;
    while (i < 32767)
    {
        i++;
        time(&t);
        puts(ctime(&t));
    }
}
```

Microsoft C: Integer count test.

## Microsoft C

I am impressed by this product. Microsoft C is a professional C implementation that conforms to extremely high standards. It produces compact code, it implements the complete, latest version of C, it compiles quickly, it is easy to use, it has the most extensive library of any C compiler for the PC, its library is fast and compact, and the documentation is marvelous. The only major improvement would be if Microsoft actually wrote and debugged your C programs.

The Microsoft C package consists of three manuals (in two binders), three disks, and a quick-reference guide. Your system must have 256K bytes of memory and DOS 2.0 or later, and you must use the latest version of LINK which is supplied with the package. Microsoft C is not copy-protected.

Microsoft is faced with the difficult task of trying to wean their old Lattice C customers to their new product, and one of their inducements is a liberal upgrade offer. Current owners of either Lattice C or the previous version of Microsoft C can upgrade to Microsoft C Version 3.0 for \$100. Although both Lattice C and Microsoft C are extremely close to the C standard, there are minor differences between the packages. Microsoft devotes an extensive section of the manual to pointing out problem areas to ease the transition. Like Lattice C, Microsoft C supports all of the PC's memory models and supports and emulates the 8087 numeric coprocessor.

Another goal of Microsoft's compiler is to provide some degree of compatibility between DOS applications and XENIX applications. The documentation clearly indicates which subroutines are common to the two operating systems, and it identifies the differences in usage of the subroutines on the two systems. This is clearly the only compiler to consider if your software development is for both DOS and the UNIX/XENIX environment.

Microsoft provides three different ways to run the compiler. Method 1 is a program called MSC that is similar to Lattice's LC compiler interface. Compiling with MSC is a two-step process. First you run MSC to translate C programs into machine lan-

guage files, and then you run LINK to combine your machine code with the library machine code to produce an executable program. Method 2 is a program called CL that automates both the compilation and the linking steps, making it easier to use the compiler for programs that don't require unusual linkages. Method 3 is a version of the CL program that uses a different set of option flags, making CL closely resemble the UNIX C compiler usage. I used this third method because it is more natural to me. Unfortunately, the convenient CL program is documented only in a manual appendix, and it is completely omitted from Microsoft's otherwise handy quick-reference guide.

#### Exemplary Manual

The manuals contain a total of 900 pages, divided into a *User's Guide*, a *C Language Reference*, and a *Run-Time Library Reference*. The *User's Guide* and the *Run-Time Library Reference* present the standard material, but they are unusually thorough and extremely easy to use as a reference. The indexes are good. The *C Language Reference* is a well-written description of C, with special attention paid to providing examples. It is organized somewhat like a language-standards document, but provides more insight and examples than a formal standards document. The *C Language Reference* wouldn't be a good manual for learning C but is definitely a good place to look for help when troubles arise.

As indicated by the benchmark results, Microsoft C produces fast programs. This is especially true for programs that rely on library functions, because Microsoft C's library appears to be highly optimized. Examination of the machine language code is easy because the compiler has an option to intersperse the original C code with the generated machine code. In its default operation Microsoft C uses registers somewhat more sparingly than Lattice C, but this allows saving two registers for use as C-register variables. Thus, Lattice C automatically attempts to optimize register usage, whereas Microsoft C gives more power to the programmer to optimize register usage. Code generation for integer expressions is similar; the Lattice subrou-

```
int table[25] = { 1, 2, 3, 4, 5,
                 6, 7, 8, 9, 10,
                 11, 12, 13, 14, 15,
                 16, 17, 18, 19, 20,
                 21, 22, 23, 24, 25 };

main()
{
    int x, loop;
    int a[25];
    long t;

    time(&t);
    puts(ctime(&t));

    for (x=0; x<=1000; x++)
        for (loop=0; loop<25; loop++)
            a[loop] = table[loop];

    time(&t);
    puts(ctime(&t));
}
```

Microsoft C: Table lookup test.

```
#include <stdio.h>
char record[132];
main()
{
    int i;
    FILE *f;
    long t;

    time(&t);
    puts(ctime(&t));
    f = fopen("test.dat", "wb+"); /* read/write binary */
    for (i=0; i<100; i++) {
        fseek(f, (long) (i * sizeof(record)), 0);
        fwrite(record, sizeof(record), 1, f);
    }
    for (i=0; i<100; i++) {
        fseek(f, (long) (i * sizeof(record)), 0);
        fread(record, sizeof(record), 1, f);
    }
    for (i=0; i<100; i++) {
        fseek(f, (long) (i * sizeof(record)), 0);
        fread(record, sizeof(record), 1, f);
        strcpy(record, "Modified");
        fseek(f, (long) (i * sizeof(record)), 0);
        fwrite(record, sizeof(record), 1, f);
    }
    fclose(f);
    time(&t);
    puts(ctime(&t));
}
```

Microsoft C: File access test.



# Borland Introduces the Laws of **TURBO DYNAMICS™**

**Laws That Work Like Magic.** Whether considering technological excellence, or innovation in areas such as pricing, not copy-protection, licensing agreements, site licenses, 60 day money-back guarantee —Borland is clearly recognized as the software industry leader. The following three laws of "Turbo Dynamics"™ exemplify our pledge for excellence.

## 2ND LAW:

**NOT COPY-PROTECTED SOFTWARE AND REASONABLE LICENSING AGREEMENTS.**

We will always offer not copy-protected versions of our software. Also, our licensing agreement is now so simple that even a child can understand it.

## 1ST LAW:

**SPEED, POWER AND PRICE.**

Borland products are known to be fast, powerful and to deliver an incredible price performance ratio. We only believe in absolutely superb software at rock bottom prices.

## 3RD LAW:

**60 DAY MONEY-BACK GUARANTEE.**

This third law is actually a first in the industry! We are so sure that you will love our software that all of our products now come backed with a 60 day money-back guarantee. No questions asked.

### Turbo Dynamics Applies to Turbo Pascal.

Borland's Pascal family of products is growing by leaps and bounds.

You can now join hundreds of thousands of users and enter the world of Turbo Pascal programming. And remember, all three laws of Turbo Dynamics apply to all Borland products.

### TURBO PASCAL™ \$69.95

**The industry standard.** With more than 150,000 users worldwide Turbo Pascal is the industry's de facto standard. Turbo Pascal is praised by more engineers, hobbyists, students and professional programmers than any other development environment in the history of microcomputing. And yet, Turbo Pascal is simple and fun to use. **Free spreadsheet** included on every Turbo disk with ready-to-compile source code. **Options:** We offer the exciting Binary Coded Decimal (BCD) option for your business applications as well as an 8087 option for your number-crunching applications at a very low charge. Please refer to the coupon. **Portability.** Turbo Pascal is available today for most computers running PC-DOS, MS-DOS, CP/M-80 or CP/M-86. **Jeff Dornheim, PC Magazine:** "In its simplicity it achieves an elegance that no other language compiler has ever displayed."

### TURBO GRAPHIX TOOLBOX™ \$54.95

**High resolution monochrome graphics for the IBM PC.** The Turbo Graphix Toolbox will give even a beginning programmer the expert's edge. It's a complete library of Pascal procedures and functions. Tools that will allow you to draw and hatch pie charts, bar charts, circles, rectangles and a full range of geometric shapes. Procedures that will save and restore graphic images to and from disk. And much, much more. You may incorporate part or all of these tools in your programs and yet we won't charge you any royalties. Best of all, these functions and procedures come complete with commented source code on disk ready to compile.

### TURBO TUTOR™ \$34.95

**From start to finish in 300 pages.** Turbo Tutor is for everyone from novice to expert. Even if you've never programmed before Turbo Tutor will get you started right away. **A must.** You'll find the source code for all the examples in the book on the accompanying disk ready to compile. Turbo Tutor might be the only reference on Pascal and programming you'll ever need.

### TURBO DATABASE TOOLBOX™ \$54.95

**The Turbo Database Toolbox is the perfect complement to Turbo Pascal.** It contains a complete library of Pascal procedures that allow you to sort and search your data and build powerful applications. It's another Borland set of tools that will give the beginning programmer the expert's edge. **Get started right away, from database!** Included on every Turbo disk is the source code to a working data base which demonstrates how powerful and easy to use our search system, Turbo-Access, really is. Modify it to suit your individual needs or just compile it and run. **Remember, no royalties!**

## TURBO PASCAL FAMILY

Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8008. CA (800) 742-1123

Carefully Describe your Computer System:

Model is: ☐ 8088 ☐ 8086 ☐ MS-DOS ☐ CP/M-80 ☐ CP/M-86

I use: ☐ Turbo Pascal ☐ Turbo Graphix Toolbox ☐ Turbo Tutor ☐ Turbo Database Toolbox

The disk size I use is: ☐ 5.25" ☐ 5.25" ☐ 5.25"

Name \_\_\_\_\_

Shipping Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_

**60 DAY MONEY-BACK GUARANTEE**

Amount (CA tax) \_\_\_\_\_

Payment: ☐ VISA ☐ MC ☐ Bank Draft ☐ Check

Debit Card Expiry Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Card # \_\_\_\_\_

COOs and Purchase Orders WILL NOT be accepted by Borland. California residents, and the sales tax in other states, and \$10.00 more (subject to state law) must be added to the total.

**BORLAND INTERNATIONAL**

4585 Scotts Valley Drive, Scotts Valley CA 95066  
Phone (408) 438-6400 Telex 172373

CIRCLE 142 ON READER SERVICE CARD  
Copyright 1985 Borland International BI-0101

Turbo Pascal, Turbo Database Toolbox, Turbo Graphix Toolbox, Turbo Tutor and Turbo Access are trademarks of Borland International, Inc.

## PC FACT FILE

**Lattice C**

Lattice Inc.  
P.O. Box 3072  
Glen Ellyn, IL 60138  
(312) 858-9750  
List Price: \$500

Requires: 256K RAM, two disk drives, DOS 1.1 or later.

CIRCLE 681 ON READER SERVICE CARD

**Instant-C**

Rational Systems Inc.  
P.O. Box 480  
Natick, MA 01760  
(617) 653-6194  
List Price: \$495

Requires: 320K RAM,

one disk drive, DOS 1.1 or later.

CIRCLE 680 ON READER SERVICE CARD

**Run/C**

Lifetouch Associates  
1651 3d Avenue  
New York, NY 10028  
(212) 860-0300  
List Price: \$150

Requires: 256K RAM, one

disk drive, DOS 2.x.

CIRCLE 679 ON READER SERVICE CARD

**Microsoft C**

Microsoft Corp.  
10700 Northup Way  
Bellevue, WA 98009  
(206) 828-8080  
List Price: \$395

Requires: 256K RAM, one

disk drive, DOS 2.x, LINK 3.0.

CIRCLE 678 ON READER SERVICE CARD

The Lattice C compiler comes on three disks. Because it supports four memory models, there are four copies of the compiler, four copies of the library, and so on. Installation is easy on a hard disk. Lattice supplies an installation batch file that creates all the necessary directories and moves everything into them. Installation onto a floppy is somewhat harder. The compiler is not copy-protected, and it requires at least 128K bytes of memory.

Lattice C is harder to use than some other compilers because running the separate pieces of the language system is not completely automated. Unfortunately, the documentation emphasizes the most manual methods and provides less information on a half-way automation aid called LC. A separate OMD (Object Module Disassembler) program must be run to produce assembly language listings of programs.

The Lattice subroutine library is reasonably complete, but it certainly could be more inclusive. The program has the standard C portable I/O library plus some of the lower-level I/O calls first popularized on UNIX systems. The library also contains UNIX-style memory allocation procedures, SETJMP/LONGJMP error-handling routines, standard math functions, and common string-handling functions. In the manual, the discussions of the library functions are organized topically, which makes a good introduction but a poor reference.

**DOS the Problem**

I'm surprised a compiler that has enjoyed such long and overwhelming success on the PC has so few DOS-specific facilities. Like most other PC C compilers, Lattice supplies UNIX-style I/O facilities, while neglecting many things that are required in virtually every program written in the visual, interactive style of the PC. For example, you would have to call DOS directly to find out the time, date, size of a file, or free space on a disk. Forget about reading a directory in one of your programs unless you want to learn the DOS system calls to do it yourself. There is no graphics or screen-oriented text output support. Most of these facilities are available as separate extra-cost packages from other vendors. Today, however, the Lat-

tice C enhancement business is a small industry.

Lattice C has always done well in benchmarks, so it is not surprising that in this simple series of tests it demonstrated excellent performance. Examination of the object code reveals the secret to its success. The program uses the meager register set of the 8088 CPU well and avoids the code fluff common to many other compilers. You might note that two of the benchmarks, file access and string concatenation, measure the speed of the Lattice subroutine library rather than the speed of the generated code. In these two benchmarks, Lattice did surprisingly poorly, indicating that the program should attempt to further optimize these important facilities.

Lattice C is a very complete implementation of the C language. The manual lists ten areas where Lattice deviates from the C standard, but many of these deviations are minor language extensions that can easily be avoided. However, two deviations are potentially serious: Lattice disallows structures or unions as function arguments and allows application of the "address-of" operator to an array name. These are serious problems for anyone concerned with moving C software to different computers.

Although the Lattice manual is clearly written, I disliked its organization. The manual is probably good for people just learning C, but I found it difficult to use as a product reference. One of the better parts of the manual is the section on Lattice's assembly language interface. Many C programs will need to have small sections coded in assembly language, and it is admirable of Lattice to provide instructions—many other compilers don't.

**Run/C**

Run/C is a simple, easy-to-use C interpreter. Using Run/C is much like using BASIC with all of the C data types and control structures. Ostensibly, Run/C's goal is to give you the convenience of BASIC coupled with the power of C. On the first point it succeeds, on the second, it falls a little short.

The Run/C manual and advertising copy claim that the program interprets "pure, unadulterated Kernighan and Rit-

tice interface is somewhat faster, while Microsoft's is better at arranging in-line code for long and unsigned variables.

**Lattice C**

Lattice C is currently the most talked about and the most imitated C compiler for the PC. Until recently, it was sold both under its own name and also as the Microsoft C compiler. Lattice's popularity stems from many features. It was one of the first compilers for the PC with a solid, complete implementation of C. It was also one of the first C compilers for the PC to provide multiple memory models so that programmers could choose between compact, efficient programs or slightly bulkier but potentially much larger and more complex programs.

# Borland's SuperKey And SideKick Work So Well Together, You'll Hardly Work At All.

**AN UNBEATABLE TEAM AT AN UNBEATABLE PRICE!** We've teamed the best with the best to make the greatest. The best keyboard enhancer, SuperKey®. The best desktop organizer, SideKick®. The dynamic duo working hand in hand to let you do many different things at once. A way that cuts down the keystrokes, so you're working instead of just typing. A way that wasn't possible until we paired the electronic wizardry of SuperKey with the practical efficiency of SideKick. SuperKey brings the magic. SideKick does the details. The "S-Team" works beautifully together because we designed them that way.

**GET SUPERKEY AND SIDEKICK TODAY** and you'll have an unbeatable team at an unbeatable price — and a \$15 rebate back in the mail.



**SIDEKICK INCLUDES:** \* Calculator \* Notepad \* Auto dialer & phone directory \* ASCII table \* Perpetual calendar & datebook \* Help window \* Full-screen editor with word-wrap, paragraph editing and much more.

(Chances are that once you have SuperKey and SideKick working together for you, you'll never need to use a word-processing program again).

**SUPERKEY INCLUDES:** \* Encryption to keep confidential files confidential \* Programmable keys that let you turn a thousand keystrokes into one \* Keyboard lock \* Automatic turn-off of your screen after a pre-set time so the expensive phosphorus in your monitor's screen isn't etched or ruined \* Secret Password protection and more.

**IF YOU USE SIDEKICK, YOU NEED SUPERKEY. BECAUSE SUPERKEY AND SIDEKICK CAN MAKE YOUR DAY GO SOMETHING LIKE THIS:**

**8:00 am.** You get to work on time, despite the 44-mph turkey ahead of you in the fast lane. It's spread-sheet time. You hit one key. Lotus 1-2-3 (or whatever) is up and running. (One key. Because SuperKey has recorded all the CD-123 <ENTER> >123< ENTER> <ENTER> / F <ENTER> R <ENTER> SALES <ENTER> <?> <?> foolishness and your one keystroke played all that back instantly. One keystroke instead of a minute).

**8:33 am.** You're into the spreadsheet. Phone rings. You kick in SideKick's Notepad—without leaving your spreadsheet. You talk. You listen to Frank. You make notes that tell you that Frank is opping the numbers from yesterday's order and he needs a new price and delivery date. He wants a meeting. Fast, but when? You have SideKick fire up your Calendar. Time agreed and noted—in SideKick's Notepad. Conversation ends. Your spreadsheet is still there.

**8:57 am.** You're watching the spreadsheet but you're thinking about the new bid you have to figure out. So you have SideKick's Calculator pulled up on the screen—over a small piece of the spreadsheet—which doesn't go away.

**8:59 am.** SideKick is coming up with new numbers. SuperKey keeps the spreadsheet on a roll. Satisfied with the numbers, you have SideKick auto-dial Frank's number. Talk. Talk. Hang up.

**8:59 am.** Spreadsheet about done. You're watching it, but thinking about what Frank just said on the phone. He listed your numbers. He ordered. He said, "That was fast. We won't need that meeting." (SideKick catches it from your Calendar). And he also said, "How did you get all that done so quickly?" And you said, "I've got a couple of new guys working for me."

**IF YOU DON'T USE SIDEKICK YET, YOU GET THEM BOTH AND FOR A LIMITED TIME, A \$15.00 CASH-BACK!** Because SuperKey and SideKick are so compatible, we let them move in together. Into their own blister-pack. With the \$15.00 cash-back coupon and the manuals. Which is what you get for \$139.90 instead of the usual \$154.90. You need to fill-in the cash-back coupon, along with your registration cards and proof of purchase, and mail it back. We'll rush you your \$15.00 rebate right away. Rebate offer ends March 31, 1986. (PS. You can still buy SuperKey and SideKick separately. SuperKey \$69.95, SideKick \$84.95. Not copy-protected.)

## THE CRITIC'S CHOICE

"If you want the ultimate in sophistication, you won't find any thing finer on the battlefield right now than Borland's SuperKey and SideKick combo." **LEON A. WORTMAN, InfoWorld**

**BORLAND**

4585 Scotts Valley Drive, Scotts Valley CA 95066  
Phone (408) 438-8400 Telex 172373

**NOT COPY-PROTECTED**

## SuperKey SIDEKICK

SuperKey and SideKick require DOS version 2.0 or later  
Software for your IBM®PC, XT, AT, 3270, PCjr and true compatibles

Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 253-8008, CA (800) 742-1133.

**Yes, I want the Best!**

Quantity \_\_\_\_\_

The SideKick SuperKey \_\_\_\_\_  
Retail \$154.90

\$15 cash back ONLY when purchased together. Both come in one box (excepted)

SuperKey \$69.95 \_\_\_\_\_  
SideKick \$84.95 \_\_\_\_\_  
(copy protected)

SideKick \$84.95 \_\_\_\_\_  
(not copy protected)

Submitter \_\_\_\_\_

(CA res. add 6% tax) \_\_\_\_\_

Amount Enclosed \_\_\_\_\_

Payment ☐ VISA ☐ MC ☐ BankDep't ☐ Check \_\_\_\_\_

Credit Card Exp. Date \_\_\_\_\_

Card # \_\_\_\_\_

**\$15.00**

**Cash Back**

\$15 cash back credit upon receipt of signed invoice and cash-back coupon.  
 Name agreement and cash-back coupon.  
 Mail \$15 cash-back rebate includes but not limited to: These prices include shipping to all U.S. states. All foreign orders add \$10 per product ordered.

Name \_\_\_\_\_

Shipping Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_

COD's and Purchase Orders WILL NOT be accepted by Borland. California residents add 6% sales tax. Outside USA add \$10 and make payment by bank draft payable in US dollars drawn on a US bank.

Copyright 1985 Borland International 84-1014

SuperKey and SideKick are registered trademarks of Borland International, Inc.  
IBM is a trademark of International Business Machines Corp.

MS-DOS is a registered trademark of Microsoft Corporation. Microsoft Corp.  
CIRCLE 147 ON READER SERVICE CARD



chie C." This is one of those advertising claims that sounds too good to believe, and it is. In Section 5 of Run/C's manual there is a more honest discussion of the areas where the program falls short of being a complete C implementation. Run/C is complete enough to teach you C, but it is not complete enough to run many example programs. Fortunately, the package is a proper subset of full C, so it is easy to move a Run/C program to almost any other C system. The converse operation, however, is not likely to be easy.

A more serious problem with Run/C is its speed. Interpreters need not execute programs as quickly as compilers, because most programmers are willing to trade some execution speed for ease of use. However, only so much execution speed can be traded before ease of use becomes irrelevant. As the simple benchmark results indicate, it takes Run/C about 15 minutes to count from 1 to 32,000. That's faster than you or me, but it's five times slower than interpretive BASIC. Run/C's performance may be adequate for some programs. However, many applications could not be tested thoroughly with Run/C because it typically executes 1,000 times slower than a good C compiler.

The Run/C interpreter and about 100 extremely short example programs are supplied on the distribution disk. The software is not copy-protected. Run/C requires at least 256K bytes of memory, one double-sided disk drive, and DOS 2.0 or later. For serious programming, you will also need a true compiler to produce finished versions of your programs.

### Basically BASIC

Using Run/C is easy, especially if you've ever used BASIC on the PC. The Run/C display looks like BASIC, its simple editor works like BASIC's, and it automatically numbers lines for easy reference. In addition, it uses familiar commands like NEW, LOAD, LIST, and SAVE—just like BASIC. For editing longer programs, you can automatically chain to your favorite text editor and then automatically return to Run/C.

As promised, there is no "compilation" delay once you have finished editing your program text. Just enter the RUN

```
main()
{
    int i;
    double a, b, c;
    long t;

    time(&t);
    puts(ctime(&t));

    for(i=1; i<=10000; i++) {
        a = 0.; b = 1234.; c = 78.9;
        a = b * c;
        a = b / c;
    }

    time(&t);
    puts(ctime(&t));
}
```

Microsoft C: Floating point test.

```
main()
{
    int i;
    char a[80], b[80], c[100];
    long t;

    time(&t);
    puts(ctime(&t));

    for(i=1; i<=10000; i++) {
        strcpy(a, "This is a string");
        strcpy(b, "This is a longer string with lots of words in it.");
        strcpy(c, a);
        strcat(c, b);
    }

    time(&t);
    puts(ctime(&t));
}
```

Microsoft C: String concatenation test.

command, and your program starts. If your program has bugs, you can activate TRACE (printouts of changing variables), TRON (printouts of executing statements), or PRON (a simple execution analyzer). These operations are as simple as they are in BASIC.

What is missing from Run/C? Since the interpreter is organized by lines, Run/C disallows multiline comments and multiline strings. Run/C also disallows data declarations in nested blocks—a relatively unused feature of C. Two important omissions center on the preprocessor; the program disallows defines with parameters,

and it doesn't handle conditional compilation. But the worst drawback is that Run/C doesn't fully support the C data types. Use of the following key words will lead to an error message: register, auto, enum, typedef, and extern.

The manual is generally excellent. All features are listed in an alphabetic reference section. This makes it easy to look things up. There is a good index and a reasonable tutorial to help the beginner get started quickly. Occasionally the manual writers were a bit sloppy. For example, on page 5-4 a table of octal codes for control characters was identified as being in "dec-

imal except where otherwise specified." An experienced C programmer would know that the "'015'" is an octal specifier, but most people would be confused. In the description of the DOSTIME and DOSDATE functions, the documentation muddles a discussion involving pointers and arrays. Similar descriptions for the STRCAT and STRCPY functions are much better.

In summary, Run/C gets excellent marks for ease of use, excellent marks for the manual, good marks for completeness (although they should advertise more honestly), and poor marks for speed. If the package gets faster and is made more complete, it could be a winner.

#### Instant-C

Instant-C from Rational Systems may change your conceptions about interpreters. Instant-C combines the convenience of an interpreter with the execution-speed advantage of a compiler. The subset of C supported by Instant-C is almost complete, and it should be truly complete with the upcoming shipment of Version 2. The price of Instant-C is a clear indication that this is a professional productivity tool, not a hacker's toy.

The first thing I noticed about Instant-C was its speed. This program produces fat native-object code. Examination of the simple benchmarks shows that Instant-C is in the same ballpark as the Lattice and Microsoft compilers in terms of speed. The technique used in Instant-C is conceptually simple. Each time you change a function the program automatically recompiles it to true PC-native executable code. This process is fast even with a large program because only one function at a time needs re-compilation. Since everything is memory resident, the automatic function recompilation occurs without any disk access.

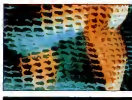
Instant-C requires 320K bytes of memory and DOS 1.25 or later. The program is supplied on two disks; one contains the interpreter and the attached full-screen editor, and the other contains the C language subset, including files and the sources for the library. The package is not copy-protected. Keyboard- and screen-reconfiguration files are included in the package so that Instant-C can be adapted to MS-DOS

machines that aren't fully compatible with the PC.

The style of Instant-C should attract people who are fluent in C because the interactive environment is that of C itself. This program does not present an "imitation BASIC" environment. You can run a program by typing in the command

```
main()
```

**P**rogramming in C is like driving a sports car: Everything is manual and rudimentary, but control is extreme.



instead of the customary BASIC-style RUN command (although RUN is also available). The advantage here is enormous. You can type many valid C constructs for execution by the interpreter. For example, the command

```
0xff - 010 + 3
```

displays the result 250. (The C parlance above is an expression that starts with hexadecimal ff, subtracts an octal 10, and then adds a decimal 3.) Those of you who don't understand C pointers can interactively enter pointer-arithmetic expressions to see just what is happening. Even more important is the program's ability to call any function interactively and display the results.

#### Standing Tail

Another important feature of Instant-C is its primitive ability to produce standalone programs. As the documentation free-

ly admits, for professional software development you will also need a professional compiler for producing finished versions, but for some less-demanding applications, Instant-C's standalone execution facility can be helpful.

Most real C programs are stored in several files so that related functions are grouped together. Unlike Run/C's primitive "one-file-one-program" view of the world, Instant-C lets you work on applications stored in multiple files, all of which are resident simultaneously in the program.

This feature is much less confusing than it sounds, although it is not well described in the manual. Future versions of this product will allow you to link your Instant-C programs to external-object module libraries as well as work on programs 8,000 to 10,000 lines long.

The editing portion of Instant-C is well designed. There is a simple full-screen programmer's-style editor for editing one function (or external declaration) at a time. Instant-C produces and accepts plain ASCII text files, so you can do extensive file editing using an external editor if you wish.

Unfortunately, I found several bugs in my version of the product. However, a call to Rational Systems produced instant help for Instant-C. Two bugs were known and had been fixed for the next release, and one was something they were aware of and were trying to fix. The product support was excellent.

The weakest part of this generally excellent package is the documentation. Portions of the manual are good, especially the first three chapters. However, when you get to Chapter 9, a description of Instant-C's function library, it is outrageously terse. Over 100 functions are detailed in 25 pages. For example the description of the FOPEN command doesn't mention the "+" that you can append to the mode argument to open a file in a read/write mode. The index could be more complete, and several of the appendixes appear to be lacking contents. The manual is clearly written, it just needs more beef. But, overall, the best thing about Instant-C is its speed. Instant-C means instant gratification. ■

# Pascal Unlimited.

Once you've gotten some experience under your belt, you'll find that even with a very decent program like Turbo Pascal®, you start scraping the ceiling of its abilities. You need a Pascal that's conditioned for the serious developer.

## New Microsoft® Pascal.

A totally comprehensive and complete package, it lets you tackle large projects by giving you the utilities, features, and support libraries that professionals expect.

Unlike Turbo, Microsoft Pascal offers separate compilation. So you can create your own module to use and re-use in your Microsoft language programs.

In addition to full XENIX® compatibility, our compiler also supports the new Microsoft and IBM® Networks.

If you've already invested in Turbo Pascal, we'll make it worth your while to move up. We're offering a rebate of \$40 when you upgrade to Microsoft Pascal.

**MICROSOFT.**  
The High Performance Software®

For the name of your nearest Microsoft dealer, call (800) 426-9400. In Washington State, Alaska, Hawaii and Canada, call (206) 828-8088.

### Microsoft Pascal Compiler Version 3.3 for MS-DOS

	Microsoft Pascal v 3.3	Borland Int'l Turbo Pascal v 3.0
Separate module compilation	Yes	No
Conditional compilation	Yes	No
Full memory usage (to 1 megabyte)		
program code	Yes	No
data	Yes	Yes
Overlay support	Yes	Yes
Math library support		
8087/80287 emulation	Yes	No
8087/80287 coprocessor support	Yes	No*
Floating-point	Fast IEEE	non IEEE
BCD floating-point		No*
MS-DOS® 3.1 network support (incl. IBM LAN)	Yes	No
Link multiple routines	Yes	No
Link existing third-party libraries	Yes	No
Link with Microsoft FORTRAN, C and Macro Assembler	Yes	No
Relocatable object format	Yes	No
Transport source between MS-DOS and XENIX	Yes	No
Do source level debugging	Yes	No
LINKER included	Yes	No
Library Manager included	Yes	No
Utility to modify and examine header	Yes	No
Compress utility	Yes	No
Pascal Benchmarks—done on a COMPAQ Plus™ with 512K memory with no 8087		
	—Execution Time—	
Gauss-Seidel	:05.15	:07.60
Sieve of eratosthenes	:13.15	:15.88
Trit	:13.11	:34.97

\*Option available separately



Microsoft, XENIX and MS-DOS are registered trademarks and  
The High Performance Software is a trademark of Microsoft Corporation. IBM is a  
registered trademark of International Business Machines Corporation.  
Turbo Pascal is a registered trademark of Borland International, Inc. COMPAQ Plus  
is a trademark of COMPAQ Computer Corporation.

# PC STORYBOARD:



## BUSINESS GRAPHICS GET MOVING

Can't draw? No eye for color? Not interested in learning complex graphics programming and commands? So what? Your presentations can still look colorful, inspired, and full of verve.

**T**he marketplace for personal computer products is like a many-fingered river of lava. One of the tributaries may be cooling fast, hardening for the centuries, while another is gushing forward, setting the world on fire. Where PC graphics software is concerned, there's some impressive movement taking place. But guess where one of the hottest new business-oriented graphics products comes from. Give up? How about stodgy (at least when it comes to software) old Big Blue? (See sidebar, "IBM's Finally in the Picture.")

Not long ago, true flexibility in a graphics package for the IBM PC was still only a product of the imagination. You had to choose between packages that gave you business graphics based on tables of numbers and others that offered freehand drawing. However, the past year has seen the release of new products that combine these features in varying degrees. The new packages let you build graphs from spreadsheet figures, draw freehand, add text or clip art to your graphics, and edit any picture on your screen.

IBM's *PC Storyboard* has an impres-

sive collection of graphics capabilities. The package features an array of truly dynamic options, including fancy "dis-solves" and "come-togethers" that have more in common with slick, computer-generated video images than the plain, static business images of yore. These are backed by powerful, easy-to-use editing and drawing functions.

*PC Storyboard* consists of four separate programs: *Picture Maker* lets you draw, create graphs, and edit pictures. *Picture Taker* incorporates external file data, such as a 1-2-3 spreadsheet, into a presentation.

## PC STORYBOARD

Story Editor both rearranges the graphics into a coherent story and defines the dissolve methods for transitions between pictures. Story Teller automates this "slide show."

*PC Storyboard* needs a color monitor and adapter to function at its best, as well as 256K bytes of RAM and one disk drive. However, we reviewed it on a system that had 512K bytes of memory, two disk drives, and a Hercules Color Card with an IBM color monitor. To see what difference color made, we also tested the package on a COMPAQ Plus with a hard disk and a monochrome graphics display.

*PC Storyboard* worked well on both systems. However, because its commands and slick graphics techniques are really intended for color, *PC Storyboard* lost both clarity and ease of use on the monochrome display. Reading the command lines between base colors and their outlines or shadows was almost impossible on the monochrome display.

*PC Storyboard*'s sophisticated dissolve techniques and excellent story-editing capabilities make it easy to create impressive on-screen presentations. You can use slide-making attachments (such as the Polaroid Palette and Kodak's screen hood) and video units to capture *PC Storyboard* images from the color display. To print, IBM's Color Printer is recommended, but color transparencies require the JetPrinter. As of this writing, *PC Storyboard* does not support plotters.

On the other hand, screen display lends itself to many hardware options. First, of course, is the IBM PC color monitor, but

you can also use a larger RGB (red-green-blue) monitor, a composite video monitor, or an ordinary television. Alternatively, you can hook up to any size video projector unit, such as a Vivid Systems' Lime-light Projector, and get wall-sized views—and, best of all, you can run the entire pre-

**PC Storyboard's sophisticated dissolve techniques and excellent story-editing capabilities make it easy to create impressive on-screen presentations.**

sentation onto a VHS- or Beta-format video cassette recorder and later incorporate dialog and music into your show.

In general, you don't need to modify your hardware to accommodate the package. Unfortunately, you don't even need to add a mouse, since *PC Storyboard* cannot take advantage of this useful tool.

That's the overview. Now for the details: How easy was the program to use? How flexible? How fast? The answer is that *PC Storyboard* gave us a great deal of graphic power with very little hassle.

### Picture Maker

Picture Maker, the part of *PC Storyboard* that you'll use to create most of your pictures, opens with a screen that's blank except for a cross-hatch cursor in its center. In order to begin this section, type a single-letter command such as T(ext),

G(raph), or D(rew Freehand).

Each function has its own set of command line sequences. Text asks for the words; Graph asks for the input data, then shows another line for type of graph, its scale, and other pertinent data. Draw, which doesn't use a command line, simply places you on the screen and lets you begin immediately.

When working with text, you can define such options as font, color, position, outline or shadow effects, and type size. *PC Storyboard* uses only three basic commands to select these: Text, Size/Shadow/Slant, and Write.

Once you're in text mode, the command line asks for your input text. The last line of text used appears on the command line in magenta or in low-intensity characters on monochrome displays. If you want to reuse it, just press Enter. You can also move the cursor to the right and add text while reusing the original. Since you might often use the same material, slightly modified, in different pictures in a single presentation, this is a useful feature.

Once you've entered your data, Picture Maker holds your text for additional information on form and appearance before writing the letters to the screen. The Size/Shadow/Slant command slants and shadows the lettering. Rather than limiting you to predefined italic fonts and shadow shapes, *PC Storyboard* frees you to change the form of the letter itself on the screen. Using the cursor keys, you can play with different angles and shapes to preview what the final letters will look like, then change them interactively before writing out the entire line.



If you can't draw, you can still achieve a professional look by cutting and pasting images from the 10-page library.



An RGB monitor and *PC Storyboard* give 4 colors that expand to a palette of 16 with composite video.

If all this still doesn't bring you to the letter shape you like, use the Alt-(Typeface Set) command to select a different font from the four available in *PC Storyboard*. These four fonts come in five point sizes and can be printed as bold, thin, roman, or PM.

Once the text looks the way you want it, you can use the cursor to move it around the screen. To center it on the cursor, start by using Alt-W(rite Mode Set) to rotate the elastic box that blocks out the type shape on the screen. When the text is centered, the box changes color, and you can press Enter to fix it there. Unfortunately, with a monochrome display, you cannot easily tell when you have arrived at the right place. As a last resort, two actions can bail you out if your text still looks wrong: Select Undo to remove the text, or use the Write Text command to continue manipulating any of the text attributes.

Creating an entirely new typeface is another feature that *PC Storyboard* offers.



*PC Storyboard* enhances your presentations by dressing up your text with four fonts in five sizes and many fancy options.



In addition to bar charts and pie charts, *PC Storyboard* offers standard graphing options, as shown in this set of area charts.

The Alt-0 to Alt-4 commands let you design special symbols and characters, combine them into a logo, then incorporate the logo or frequently used symbols into your pictures. Recall is accomplished by associating a keyboard letter with the symbol, then typing the letter.

## Graphs

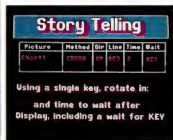
The commands Alt-G(raph Definition) and G(raph Draw) bring up a command line that asks for the input data. For a single row of bars or a single line, simply enter the data. For stacked bars or multiple lines, you must overlay several graphs. To explode a pie chart, enter a negative number for the exploded piece.

Further information that *PC Storyboard* asks for includes which type of graph to use, what scale, and low and high values. You can also tell it how much space to leave between the bars on bar charts or how wide to make the line for a line chart.

The F5 key displays the color palette



When it comes to charts, you don't have to choose between bar or pie. You can represent data two ways in one picture.



When it's time to tell your finished story, you can define the sequence of pictures as well as the dissolve method and timing.

and sets the colors. Keys F5 to F10 rotate through the three sets of colors.

Positioning the graph is done with the arrow keys that move the cursor around on the screen. Once it's in place, Graph Draw pulls out an elastic box that establishes the size and shape of the graph. Pressing Enter displays the graph. As in the text mode, you can use the Undo command to remove the graph if it needs more work.

One major advantage of *PC Storyboard* is the ease with which you can change graph types and create new graphs. Most packages won't let you transfer data and chart attributes from one chart format to another. For instance, you can't suddenly decide to put this data in a pie form rather than vertical bars, or display it with a single piece of the pie exploded out.

*PC Storyboard* lets you change any image easily; type Undo to remove the current graph, then Alt-G(raph Definition) to reenter graph mode. Alt-G sidesteps reentering the data, since you'll want to keep the current data and change only the graph type on the graph information command line.

Multiple bar or line charts require overlays, each showing a separate bar or line. Layering them so that the ones with the most data are on the bottom and the lesser ones on top creates the graphs. Freehand drawing and editing are also possible with *PC Storyboard*, and you can store images in a graphics library for later retrieval.

Selecting one of the drawing commands, such as Draw Freehand, Line Draw, Round Draw, or Multiple Commands, places you directly onto the display screen. Drawing is done with the arrow keys, and you see what you draw as you draw it. *PC Storyboard* lets you draw straight lines in any direction, create boxes

## PC FACT FILE

*PC Storyboard*, Version 1.0  
IBM Corporation  
P.O. Box 2328  
Menlo Park, CA 94025  
List Price: \$250  
Requires: 256K RAM with DOS 2.0 or 2.1, 320K with DOS 3.0, 384K with PCjr; one disk drive, color/graphics monitor.  
CIRCLE 691 ON READER SERVICE CARD

## PC STORYBOARD

and round shapes, use a series of points, freehand draw, and zoom in on any part of the display. You can even shade any part of your picture with one of the fill patterns pulled out from the image library.

The F5 to F10 keys control the color palette in the drawing as well as in the graph mode. The Shadow command defines the direction and amount of shadow and operates through the cursor keys. You can add fill and shadow colors to whatever you want to draw.

One interesting *PC Storyboard* feature is its ability to paste graphics into a variety of backgrounds from a ten-page image library. The images include arrows, asterisks, text banners, and special symbols denoting meetings, computer hardware, and other miscellaneous graphics. The program even offers a page of complex fill patterns that you can use with any closed shape.

*PC Storyboard* lets you draw almost anything you want. You can create any shape and zoom in on it to revise it. You can erase a figure pixel by pixel, or wipe out the entire contents of the elastic box that comes with the Erase command. In fact, you can use the elastic box for cut-and-paste operations as well as erasure. *PC Storyboard* also lets you overlay text, graphs, drawings, and logos. The only disadvantage is that once you have overlaid a set of images, you have only one opportunity to separate the pieces again: you must use the Undo command on the next keystroke.

For those times when a different cursor shape (or none at all) would be easier to work with, *PC Storyboard* offers four variations on cursor shape: none (no point visible), a dot, a small cross, and a full-screen cross-hatch. In addition, you can set the cursor step to whatever distance you need with the K command. The Shift key lets you have pixel-by-pixel control of the cursor movement.

### Putting It All Together

If you want to incorporate data from another package, say a spreadsheet, into your presentation, you have to exit from Picture Maker and start up Picture Taker. This is a small program that transforms the function of the PrtSc (Print Screen) key from sending the screen to the printer to sending it to

a disk file. After you set the Picture Taker to on, the Shift-PrtSc combination works differently even when you have entered another application, such as a spreadsheet program. You can elect to continue to print out an image copy of the screen on your printer, but in addition, Picture Taker takes a snapshot of your screen image for later use in *PC Storyboard*. Once you have created your pictures, you need to arrange them into a coherent and focused story. This is where Story Editor comes in.

Story Editor offers you two menus. The first asks for the name of the story, which can be new or a variation on an existing story. After entering it you go to the editing screen, where you select the pictures in the sequence you desire, define the dissolve methods for transitions between pictures, set the timing elements and the colors, and indicate whether to display the full picture or only a specific part.

This last feature is particularly well designed. Using the F5 key interactively to set the dimensions, you can edit the borders out of a spreadsheet file or build a bulleted list in graduated steps.

Once the story is complete, the Story Teller program is what actually runs it. To present the finished version, call up Story Teller and then either let it present the story, or use the function keys to control the pace yourself.

*PC Storyboard's* manual is clear and easy to use, except for its hard-to-find index, which is the second-to-last slot. The section entitled "Learning *PC Storyboard*" is excellent. Its tutorial takes you through the major components of the systems and explains clearly each command. The Help function—also well designed—is easy to use and gives clear explanations.

Overall, IBM has done a good job: *PC Storyboard's* only big lack is support for a mouse or drawing tablet. However, it is an exciting package.

If you need to work with hard-copy output, or you cannot afford the loss of resolution that results from using videotapes, wait awhile—IBM may improve *PC Storyboard* to include other output options. ■

*Diane Burns and S. Venit are frequent contributors to PC Magazine.*

## IBM's Finally in the Picture

IBM enhances its software image with its flashy new graphics package, *PC Storyboard*.

I'm a rock-ribbed IBM hardware fan. Especially when it comes to the F-16 of office automation, IBM's PC AT. With an 8-MHz crystal and an EGA, nothing can touch it.

But all software sporting the IBM label has been uniformly mediocre—until now. While some of its Personally Developed Software is interesting, virtually everything else it has released is either repackaged PFS beginnerware, clunky code ported down from IBM minis, or ghostly third-party fluff that gives IBM a bad name.

*PC Storyboard* is the first piece of IBM software worthy of the three-initial stamp of quality on its slipcase. Written by a new team of developers at IBM's Menlo Park, California, Applications Development (MPAD) facility, the

package is truly awesome. It's powerful, fast, flexible, easy to use, and capable of producing extraordinary graphics effects with a minimum of fuss.

In fact, *Storyboard* has already become a presentation graphics standard. At recent trade shows, half of the software demos boasted its characteristic eye-popping dissolves, fades, weaves, and other distinctive tricks, with good reason—for telling stories it is superior to everything out there. The only complaint I can possibly muster is that the manual is a funny size.

IBM is clearly moving in the direction of emphasizing visual data rather than textual and numeric data. And for the first time, it's writing sophisticated programs with thought and finesse. It's about time.—Paul Somerson



Keyboard macro utilities are acquiring new functions that take them well beyond merely storing strings to keys. Here's a comparison of six feature-filled macro packages.

Not so very long ago, macro processing programs for IBM PCs and compatibles were simple tools that allowed you to store a short character string into memory and recall it later by pressing a key or key combination. That was all the software producers claimed their products would do, and it was all that users expected of this software. This isn't true anymore. Today, the only truth regarding macro processing programs is that they change, continuously evolving features beyond anything which those early systems could manage. A fresh look at these products finds exciting new functions and capabilities that weren't there only a few months ago.

Such rapid change has given the term *macro* new meaning. Where it once referred to "a single computer instruction that stands for a sequence of operations," the producers of *ProKey*, *SuperKey*, *SmartKey*, *Keyworks*, *REI/Call*, and *NewKey* have feverishly stretched this definition into areas undreamed of only a year ago for this kind of software. The six packages reviewed here let you create and assign pop-up, multiple-choice menus to any keys you like, redesign the layout of your keyboard, lock up your keyboard to prevent tampering by others (as well as automatically black-out your screen when your system's not in use), and—if you so desire—store the entire contents of a 15,000-page document to a single key. Three of these packages include facilities for encrypting files. Two of them give you access to DOS functions from within your applications programs. The list goes on.

*PC Magazine* tested the latest versions of these six programs with an eye toward ease of

use and learning, functionality, and efficient use of memory. The accompanying tables list as many features as we could compare by objective observation. Our results may surprise you or confirm opinions you already have regarding your favorite package. In any case, macro processors are not just for storing strings to keys anymore.

#### **ProKey and SuperKey: The Big Boys on the Block**

In the months since their near-simultaneous release, so much has been written comparing the virtues of *ProKey 4.0* and *SuperKey* that it has begun to seem as if the two have the macro processor market to themselves (see "A Key Matchup: *ProKey* vs. *SuperKey*," Volume 4 Number 15, page 37, and "Can *SuperKey* Soup Up Your Macros?" Volume 4 Number 20). Though both are excellent programs, they are certainly not alone in the world—or even necessarily the best ones to use with your particular applications. It's a highly competitive market.

In their favor, *ProKey* and *SuperKey* are command- as well as menu-driven, a combination that allows you to learn either of them on

# Power Plays At Your Keyboard

## SIX NEW MACROS

the fly by using menus, then sidestep the menus in favor of speed when you know what you're doing. Almost all *ProKey* and *SuperKey* features are accessible from their menu levels, allowing you to begin using either program right out of the wrapper. This is just as well, since I can't honestly recommend either program's manuals as anything but reference tools.

*SuperKey* is a large program—the largest of all the macro processors reviewed here—chock-full of features you may or may not need. Despite its much-vaunted compatibility with Borland's *SideKick*, you can't run the two together under PC-DOS 3.0 in a 128K-byte RAM machine, let alone run anything else. One has to wonder if you really need ancillary functions such as file encryption in a RAM-resident macro processor. If you rarely use it, it's just extra baggage that is there solely to enhance the program's cost/performance ratio (which admittedly is impressive). There are better ways to use RAM than to

load it with functions you don't frequently need.

*ProKey 4.0* is smaller, though not by all that much, and focuses its functions more tightly on the keyboard. Its menu system is reminiscent of *WordStar*, a display familiar to a great many users. Indeed, calling up *ProKey*'s default menu while in *WordStar* causes the macro processor to overlay *WordStar*'s menu almost exactly. RoseSoft, the firm that produces *ProKey*, has a long record of supporting and upgrading its product, and *ProKey 4.0* has evolved to a great extent as a result of user feedback. Unlike most of its competitors, it did not emerge into the world fully grown from the composite mind of a programming team. Its manual is full of tested ways to solve real problems with popular software, and there is a large, experienced following of users you can tap for advice.

But there are other macro processors on the market. Which one you choose is a matter of matching features to your appli-

cation, your pocket, and the way you like to work.

### Keywords: Stiff Competition

When a program is so simple to operate that you can run it the first time without documentation of any sort, you've got something special. When that same program has as many slick features as Alpha Software's *Keywords* does, it's a winner.

*Keywords* showed up at the *PC Magazine* offices in a cardboard envelope sans manual, instruction sheet, or anything more than two README files on the disk with errata notes for the manual I didn't have. I booted it up anyway by typing "keywords." A box showed up on-screen, announcing the program's presence in memory with a line reading "Press + for menu."

The keypad's Plus key, it turns out, is all you need to access all the *Keywords* functions. In the blink of an eye it can produce a series of pop-up menus that you can use intuitively to create macros, read or write macro files, access six PC-DOS functions from within an application, or change a range of *Keywords* default settings. Those who rely on the numeric keypad can easily change the program's call key to any other key on the board as their first operation, without even glancing at the user's manual.

Running quickly through the functions on each pop-up menu, I discovered a fill-in-the-blanks form for creating your own macro file menus and another form for creating text screens accessible by macros. Like *SuperKey* and *SmartKey*, *Keywords* sports a full-screen macro editor, convenient for editing many macros at one time. I couldn't wait to see the documentation for this marvel! Having struggled through manuals like *ProKey*'s clumsy looseleaf, *SuperKey*'s dense paperback, and *RE/Call*'s over-designed horror, seeing *Keywords* react to my guesses was sheer pleasure.

The complete package finally did arrive: a thin manual in a frivolously illustrated plastic box that looked more like a children's game package than a top-grade software utility. The manual was a quick read, clearly (if skimpily) outlining each *Keywords* feature. But when you coupled it with the program's on-screen behavior,

## PC MAGAZINE

### *ProKey 4.0*

RoseSoft Inc.  
4710 University Way N.E., #601  
Seattle, WA 98105  
(206) 524-2350  
List Price: \$130  
Requires: 128K RAM, one disk drive,  
PC-DOS.  
CIRCLE 700 ON READER SERVICE CARD

### *SuperKey 1.0*

Borland International  
4585 Scotts Valley Dr.  
Scotts Valley, CA 95066  
(800) 742-1133 in Calif.  
(800) 255-8008  
List Price: \$69.95  
Requires: 128K RAM, one disk drive, PC-DOS 2.0.  
CIRCLE 699 ON READER SERVICE CARD

### *Keywords*

Alpha Software Corp.  
30 B Street  
Burlington, MA 01803  
(617) 229-2924  
List Price: \$89.95  
Requires: 128K RAM (or 40K above your application), one disk drive, PC-DOS 2.0.  
CIRCLE 698 ON READER SERVICE CARD

### *RE/Call, Version 1B*

Yes Software Inc.  
390-10991 Shellbridge Way  
Richmond, B.C. V6X 3C6 Canada  
List Price: \$89.95  
Requires: 128K RAM, one disk drive,  
PC-DOS.  
CIRCLE 697 ON READER SERVICE CARD

### *Newkey*

FAB Software  
P.O. Box 336  
Wayland, MA 01778  
(617) 358-6357  
List Price: \$19.95  
Requires: 128K RAM, one disk drive,  
PC-DOS.  
CIRCLE 696 ON READER SERVICE CARD

### *SmartKey 5*

Software Research Technologies Inc.  
3757 Wilshire Blvd., #211  
Los Angeles, CA 90010  
(213) 384-5430  
(800) 824-5537  
List Price: \$49.95  
Requires: 128K RAM, one disk drive, PC-DOS 2.0.  
CIRCLE 695 ON READER SERVICE CARD

you quickly found yourself understanding concepts like "user-created moving bar macro menus" and others—topics only fuzzily covered in the manuals for the other macro processors. The manual's only major fault was a poor index. I found myself using the table of contents more often than the index to locate subjects.

The program itself includes most of the features that Borland International thought important enough to include in *SuperKey*. *Keyworks* offers file encryption—though not the federally established Data Encryption Standard (DES)—numerous macro formatting options, display-only macros, and even direct access to *SideKick*. Unlike *SuperKey*, *Keyworks* offers RAM-resident access to such useful DOS functions as file renaming and erasing, creating and deleting subdirectories, and disk formatting. Alpha Software's wonder package beats out Borland's most resoundingly in its handling of memory: The program does all this in about 20K bytes less RAM than does *SuperKey*.

I liked *Keyworks*, even if other reviewers did not (see "Making Macros and Menus with Alpha's *Keyworks*," Volume 4 Number 18, page 42). It is obvious that Alpha Software has designed the program with *SuperKey* in mind as the primary rival. While *Keyworks* is not quite as full of bells and whistles as *SuperKey*, its cost/performance ratio is still impressive, and

## Graphicaphobia

Each program's penchant for handling graphics its own way can fetch up a screenful of differences.

Graphics programs do funny things to screen displays. Because of this, special attention has to be paid to how a RAM-resident program handles graphics images. There are as many ways to solve such graphics problems as there are software companies. Each of the programs reviewed here dealt with the problem of graphics in its own way.

Of all the macro processors tested, only *SuperKey*, *SmartKey*, and *Keyworks* were able to cope with a screen that had been put into 40-column graphics mode by a graphics program. *SuperKey* turns the screen image to a multicolored hash while it is in effect, restoring the image after its window is closed. *Keyworks* blacks out the screen completely but for its menu, a somewhat more elegant solution to the thorny problem of mixing 80-column text and 40-column graphics modes. It also restores

the screen image exactly when its window is closed.

*ProKey* and *RE/Call* both claimed to have graphics modes, but these claims did not hold up during my tests with graphics software. *ProKey*'s menu failed to appear when evoked on a graphics screen, though I had installed it in memory with its /Y (graphics) option. *RE/Call* formed multicolored lines of gibberish across the top of the screen in place of its menus.

*SmartKey*, on the other hand, left the graphics image intact on the screen, superimposing half its menu over the image in 40-column mode, though all of its functions were accessible. The graphics image remained unchanged on the screen. For use with graphics software, I'd have to recommend *SmartKey*'s way of doing things over any of the other macro processors.—David Obregón

it handles memory better. Of the programs I tried, *Keyworks* is easier to use than any macro processor but *SmartKey*. And it reads *ProKey* files.

### RE/Call: Crossing the Border

Then there are programs that are just hard to like. Though a glance at the comparison tables shows Yes Software's *RE/*

### How They Compare: Memory Requirements

Feature	<i>ProKey</i> (\$139.00)	<i>SuperKey</i> (\$89.95)	<i>Keyworks</i> (\$89.95)	<i>RE/Call</i> (\$89.95)	<i>Newkey</i> (\$19.95)	<i>SmartKey</i> (\$49.95)
RAM occupied by program	40K	54K	34K	24K	14K	21K
Additional RAM required by options	1K, keyboard layout	3K, DES encryption	—	5K, graphics option	—	7K, help, user window
Macros default setting	4K	8K	5K	1K	600 bytes	0.09K
Macros maximum setting	24K	64K	30K	25K	64K	58K
Disk space needed for help or secondary files	9K (LAYOUT.COM)	37K (help files)	50K (help files)	None	None	70K (separate utilities)
Provision to temporarily suspend program	Yes	Yes	Yes	No (individual macros, on/off only)	Yes	Yes
Provision to remove program from system memory	Yes	Yes	Yes	No	Yes (under PC-DOS 1.1 only)	Yes

*Call* holding its own against the other macro programs in many areas of operation, the tables tell only part of the story. As the most difficult to learn or use, *RE/Call* stood alone among the macro processors reviewed for this issue.

You can spend a week learning to use this program—staying up late trying to find answers to your questions within the program's less than informative but very flashy manual—and still not understand how it's supposed to work. Although the version reviewed here is brand new and does away with many of the original program's major faults—like an annoying copy protection scheme—and although it includes a help function that was lacking in the first version and sells for about \$50 less than the original, *RE/Call* still has a way to go to match the competition.

Comparing *RE/Call*'s macro editor to that of any other macro processor in this review is like comparing EDLIN to WordStar. Although *RE/Call*'s macro editor lets you store and recall a set of macros as a file, it does not permit you to view the entire file in any sort of comprehensive form. Unlike every other macro processor I worked with, *RE/Call* does not store its macro files in ASCII form; therefore they cannot be edited with a word processor or other text editor.

*RE/Call*'s opening function menu offers nine options, three of which—Record, Xamine, and Swap—bring up an awkward rendition of the IBM PC's keyboard layout across the top of the screen. (Note to users of PC AT and other non-PC-style keyboards: Expect a bit of confusion translating the on-screen layout for the board under your fingers.)

You can create a macro in either Record or Xamine modes. The Record mode echoes the keystrokes you enter into your application on another line of the screen, while Xamine allows you to create a macro without entering the typed characters into your application. The latter feature also acts as a one-line macro editor, permitting you to alter the contents of existing macro keys. The third function, Swap, allows you to change an existing macro's call keys—handy if you've discovered your favorite key combination is also an important command in your new application.

The last function on the opening menu,

Environment, presents a submenu that allows you to save and retrieve macro files, change the on-screen positions of the program's window and status/edit lines, alter the speed at which keys respond, save and restore macro files, and set the Ctrl, Shift, and Alt keys into one-key mode (one-key mode causes a little red box in the middle of your application to blink when it's in effect).

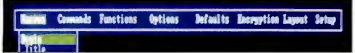
This submenu also accesses the program's Key Swap feature, *RE/Call*'s most troublesome area of operation. Too easily confused with the Swap function of the

main menu (which affects only macro keys), Key Swap permits you to exchange the location of any key on your keyboard for that of any other key. Key Swap led me into a nightmarish situation the first time I used it—a situation that is likely to recur with many new users of the program (see sidebar, "Making a Mess of Your Keyboard"). *RE/Call*'s manual gives precious little instruction on Key Swap's proper operation, devoting barely more than a paragraph near the end of the book on the subject.

The new version's help function is



Keywords (left) and *RE/Call* display pop-up menus that allow you to choose a function either by initial or by moving a bar to the desired line.



*SmartKey*, *SuperKey*, and *ProKey* (top to bottom) present horizontal menus. Of the three, only *ProKey*'s menu is clear enough to be used without additional explanations.

called up by a separate two-key combination outside the program's main system. Since it's not mentioned in the manual (having just been added to the program), you must remember the combination in order to get help. The two-key command brings forth yet another set of menus that varies according to the function you're having trouble with. This is called "context-sensitive help." In *RE/Call's* menu-driven madness, even help is a menu.

#### A Pretty (Useless) Manual

Most users learn a new program by using its manual. Lavishly produced but poorly organized, *RE/Call's* manual made learning the program harder than it should have been. Important warnings and footnotes in the text are printed in a light gray ink that's just slightly more readable than a liquid crystal display screen on a moonless night. Examples of macro creation and usage are extremely short and are limited to inserting names like "Horatio" into quotes from Shakespeare—an idiosyncrasy that doesn't translate directly into anything meaningful to the user.

Many pages consist of only one or two paragraphs lost in a sea of blank white paper. No fewer than 14 photographs of the *RE/Call* distribution disk—placed in various artistic poses against an IBM keyboard—appear throughout the manual. Not one of these photographs pertains to the text. Instead of screen shots, you're given an artist's rendition of what appears on your screen while using the program, which in some cases bears only a passing

resemblance to what's actually there.

Nor does the manual mention how *RE/Call's* window and line displays interact with other applications that may be running, even though with some graphics programs these utilities produce gibberish instead of menus on the screen (see sidebar, "Graphicaphobia"). Other awkward situ-

Most users learn a new program by the manual. Lavishly produced but poorly organized, *RE/Call's* manual made learning harder than it should have been.

ations are similarly glossed over. At the end of the book, you're told you can call Yes Software for help, only they haven't included their phone number *anywhere* in their packaging. This isn't a software manual—it's more like a corporate Annual Report, designed to gloss over reality with a stylish flare while failing to convey meaningful information.

Perhaps the problems I've discussed here will have been ironed out in another version of the program. (The first thing to look for is a new manual.) Right now, though, it falls short of its competition.

#### Newkey: Simple Power

This user-supported program, first introduced to *PC Magazine's* readers in a

sidebar of the article "Can SuperKey Soup Up Your Macros?" (see "A Low-Budget Macro Handler," Volume 4 Number 20, page 163), is a finely crafted introduction to how macro processors work. It is available from FAB Software, for \$19.95. Though it lacks the polish and extensive list of features found in its rival products, what *Newkey* can do, it does very well.

The *Newkey* system consists of two programs that are loaded into memory: *NEWKEY.EXE*—the macro processor itself—and *NEWKEYSP.EXE*—a support program that gives the user full-screen menus for changing *Newkey's* parameters, opening and closing macro files, redefining the system's control keys, and so forth. A third program—*NEWKEYSM.EXE*—that's also included on the disk is an abbreviated version of the first program, occupying 9K bytes less of RAM than *NEWKEY.EXE*. (The smaller program does not permit you to display a directory of existing macros and their translations, to display or update *Newkey's* control keys, or to clear existing macros from memory. Therefore, unless you're really pressed for RAM space, stick with the fuller program.)

*Newkey* is designed primarily as a tool to create quick macros on the go, without menu intervention. However, you can call up a complete function menu from DOS, and a subset of this menu from within an application program. The subset menu lets you access most of *Newkey's* functions, which includes altering the macro processor's own control keys and parameters,

### How They Compare: Customization Options

Features	ProKey (\$130.00)	SuperKey (\$89.95)	Keyworks (\$89.95)	RE/Call (\$89.95)	Newkey (\$19.95)	SmartKey (\$49.95)
Default colors	No	Yes	Yes	No	No	No
Command keys	Yes (during installation only)	Yes (can be changed anytime)	Yes (main access key only)	No	Yes (can be changed anytime)	Yes (can be changed anytime)
Screen menu positions	Help line (during installation only)	Yes (user's menus only)	Yes (user's menus only)	Yes	No	Yes
Help level	Yes	Yes	No	Yes	No	Yes
Selectable typing speeds	Yes	Yes	Yes	Yes	Yes	Yes

displaying directories of existing macros and their translations, and clearing RAM of all macros. Three related functions—saving, loading, and merging macros files—can be accessed only by calling up NEWKEYSP from DOS. (This isn't as big a deal as it may sound. With all macro processors, it's a good idea to use a batch file for loading a macro file into memory before entering an application, automatically making the macros ready for use.)

Unless you specifically evoke the program's function menus by pressing Ctrl, you never see the menus. Unlike in *RE/Call*, you do not need to use the menu to create each macro. This speeds things up considerably. To begin defining a macro, you press Alt=. This changes the shape of the cursor, the only indication you have that the program is actively recording your keystrokes. The next key combination you press is the macro you're defining (which doesn't appear on-screen), to be followed by the character string you're storing in memory (which does appear normally in your application). You end the recording process by again pressing Alt=. In normal everyday use, you need to remember only one *Newkey* control sequence: Alt=. Definitely a nice touch.

Storing variable- or fixed-length fields within your macros is equally simple. While recording your macro, press Alt to begin and end a variable-length field or Ctrl to begin and end a fixed-length one.

All of *Newkey's* functions and features are designed to be as easily remembered. You can learn to use this tool in less than half an hour while continuing your regular work. If at any point you forget which keys do what, those full-screen menus are there to help you. I liked this utility a great deal.

All of *Newkey's*  
functions and features are  
designed to be easily  
remembered. You can learn  
to use this tool in less  
than half an hour while  
continuing your regular  
work. Full-screen menus  
are there to help you.

Other features worth mentioning include the ability to import *ProKey* macro files—though there are some incompatibilities, *Newkey* goes out of its way to inform you where the problems are—as well as provisions to temporarily or permanently suspend *Newkey* operations. *Newkey* warns you of possible infinite loops in your macros and permits nested macros (using macros within macros) up to eight levels deep. Macro files can be created either with its own rudimentary editor or with any ASCII text editor, using a construction

syntax very similar to *ProKey's*. These ASCII files, however, must be converted into ones that *Newkey* can load into memory. The program's menu provides a function for doing this.

All of *Newkey's* menus are clear and understandable, as is the well-written user's manual supplied to registered users of the program. Unregistered users are given operating instructions through an on-disk document file. Go for the full manual, though—it's worth it. The full, no-frills manual explains each of *Newkey's* functions concisely and simply, with both a well-organized table of contents and a complete index.

As an example of all that *Newkey* can do, creator Frank Bell has included a "guided tour" of the utility's functions and features. Frankly, it left me astounded. It consists entirely of text screens called up by macros, yet it runs like a compiled BASIC program. It can certainly open your eyes to the power that a macro processor in your system's memory puts at your fingertips.

If cost is a consideration, or if you'd like to have a macro processor but don't need (or have the RAM space for) all the bells and whistles found in *SuperKey* and its high-class peers—*Newkey* can serve well as your only macro processor. My hat's off to Frank Bell of Wayland, Massachusetts, for creating an extraordinary utility at an extraordinary price.

### How They Compare: File Management

Feature	<i>ProKey</i> (\$139.00)	<i>SuperKey</i> (\$69.95)	<i>Keyworks</i> (\$89.95)	<i>RE/Call</i> (\$89.95)	<i>Newkey</i> (\$19.95)	<i>SmartKey</i> (\$49.95)
Permits use of multiple directories	Yes	Yes	Yes	Yes	Yes	Yes
Reads/writes macro files	Yes	Yes	Yes	Yes	Yes	Yes
Extensions used	.PRO/.LAY* (or layout files)	.MAC/.LAY (or user's own)	None (or user's own)	None (or user's own)	None (or user's own)	.DTX (or user's own)
Merges existing macro files	Yes	Yes	Yes	Yes	Yes	Yes
Macro directory						
Displays assigned titles	Yes	Yes	Yes	Yes	Yes	Yes
Displays actual macros	Yes	Yes	Yes	Yes	Yes	Yes
Displays text description	Yes	Yes	Yes	Yes	No	Yes
Sample macro files supplied	9 files	20 files	6 files	2 files	4 files	7 files

### SmartKey 5: Better Late than Never

The last macro processor to arrive at *PC Magazine's* offices for review was a prerelease copy of *SmartKey*, Version 5, from Software Research Technologies of Los Angeles, California. This latest reincarnation of SRT's venerable macro processor incorporates almost every single feature found in *SuperKey* and *Keyworks*, then presents a few amazing surprises of its own. It is *the* program that will stay perma-

nently in my PC AT's memory.

Coming only a few months behind the release of the previous 4.1 version (see "Macro Dynamos for the PC," Volume 4 Number 10), the newly revamped *SmartKey* is more than a match for any of the other key-defining systems I've discussed here. What's more, it occupies only 21K bytes of RAM in its minimum configuration, allowing it to be used with PCs having little RAM to spare. A fully configured

*SmartKey* system with help messages, graphics compatibility, RAM space for 5,000 characters, and an adequate editing window occupies about 30K bytes—still one of the smallest programs tested for this review.

### Ancient History

The first version of *SmartKey*—released in 1979—was written for CPM computers. The initial PC-DOS transla-

### How They Compare: Playback

Feature	ProKey (\$130.00)	SuperKey (\$69.95)	Keyworks (\$89.95)	RE:Call (\$89.95)	Newkey (\$19.95)	SmartKey (\$49.95)
Records and echoes keystrokes	Yes	Yes	Yes	Yes	Yes	Yes
Type of built-in macro editor	Single-line	Full-screen	Full-screen	Single-line	Single-line	Single-line to full-screen
Can macros be edited with an ASCII text editor?	Yes	Yes	Yes	No	Yes	Yes
Format a fixed- and variable-length macros	Yes	Yes	Yes	Yes	Yes	Yes
Other macro formatting options	No	Yes	Yes	No	No	Yes
Number of nested macros permitted	Unlimited no. of levels	Unlimited no. of levels	20 levels	Unlimited no. of levels	8 levels	20 levels
Warns user of infinite loops in macros	No	No	Yes	No	Yes	Yes
Separate macros for shift-keypad and top-row numbers	Yes	Yes	Yes	Yes	Yes	Yes
Separate macros for Ctrl equivalents of Backspace, Tab, and Enter keys	Yes	No	Yes	No	Yes	No
Can macros be keyed by mnemonic words?	Yes	No	No	No	No	No
Guarded (unerasable) macros	Yes	No	No	No	No	No
Permits display-only macros	No	Yes	Yes	No	Yes	Yes
Has facilities for user-created macro menus	Yes	Yes	Yes	Yes	Yes	Yes
Permits programmable playback delays	Yes	Yes	Yes	Yes	Yes	Yes
Includes a "Skip Macro" key	Yes	Yes	Yes	Yes	Yes	Yes
Textual descriptions of macros included in directory	67 characters	30 characters	20 characters	60 characters	None	60 characters



## SIX NEW MACROS

tions of the program reflected this origin, making little use of the PC's internal 16-bit nature, its special keys, or DOS's methods of doing things. This handicap caused *SmartKey* to lose ground rapidly to its chief rival, *ProKey* (the first version of which was released a few months after *SmartKey* hit the market). Throughout the subsequent years, in matchup after matchup, version after version, *ProKey* was consistently judged a superior package.

Playing catch-up, each succeeding version of *SmartKey* has been more finely tuned to both the needs of users and the capabilities of the PC, while retaining the original \$49.95 selling price. This evolution, painful as it may have been for the company, has proven worthwhile for PC users. In Version 5, *SRT* has a product clearly in the running as the best macro processor you can buy at any price.

Imagine that you've typed a string of characters, and now you wish you'd saved them as a macro. With any macro processor but *SmartKey*, you'd have to retype the whole thing.

### SuperShifting

In operation, *SmartKey* produces a series of 1-2-3-like horizontal menus across the top of the screen. Like *Keyworks*, the program uses a single key to access all of its function menus, which is also the numeric keypad's Plus key in the distributed version. *SmartKey* also features another key, called the SuperShift key, that effec-

tively doubles the number of possible macro key combinations you can make. None of the other programs have anything like it.

This SuperShift key also acts as the utility's "Skip Macro" command, permitting you to conveniently return a macro key combination to its original key values without undefining the macro or going through the menus. On the distribution disk, the SuperShift key is the numeric keypad's Minus key. Like the Plus (SMART) key, the SuperShift key can be easily reassigned to any other key on the board—either temporarily through the program's function menus, or permanently by using the program's separate configuration utility.

This configuration utility, *SKSETUP.COM*, also allows you to establish the program's working macro space (from 1,000 to 60,000 characters), choose vari-

## How They Compare: Other Features

Feature	ProKey (\$130.00)	SuperKey (\$69.95)	Keyworks (\$89.95)	RE/Call (\$89.95)	Newkey (\$19.95)	SmartKey (\$49.95)
Automatic screen blackout	Yes	Yes	Yes	No	No	Yes
Permits mixed use of both text and graphics modes	Yes (except 40-char. mode)	Yes (scrambles screen while in use)	Yes (blacks out screen in use)	Yes (except 40-char. mode)	No	Yes
Allows access to DOS functions from within an application	No	No	Yes	No	No	Yes
Provides a DOS command atack	No	Yes	No	No	No	No
Allows access to SideKick	No	Yes	Yes	No	No	No
Includes a file encryption facility	No	Yes	Yes	No	No	Yes (separate tool)
Compatible with ProKey files	Yes	Yes	Yes	No	Yes	Yes
Known hardware incompatibilities	Wang PC, HP 150, Sanyo MBC 555, IBM 3270 PC IRMA	None listed (user must test)	None listed (user must test)	None listed (user must test)	Sanyo 555 (needs its own version), Hercules graphics boards, IRMA	None listed (user must test)
Known software incompatibilities	IBM 5250 Emulator, SmartCom II, Leading Edge W.P., Samna Word, XyWrite II, 3COM Network	None listed (user must test)	None listed (user must test)	None listed (user must test)	Leading Edge W.P., Samna Word and Word II, XyWrite II	PC-Write, XyWrite II

ous color combinations for the program's menu and editing screens, and determine the size of the program's built-in editing window (from one line to full-screen). You can fine-tune *SmartKey* more easily than any other macro processor reviewed here until it meets your particular needs.

The software manual reflects *SmartKey*'s long evolutionary history. It's well organized, with clearly written explanations, descriptions, and usage examples. Each major topic is given its own page, allowing you to find answers quickly. The manual has a detailed index and a series of appendices that should provide even the most technically minded user with all the reference material needed to solve the most difficult problems.

#### A Better Idea

Like *Keyworks* and *SuperKey*, *SmartKey* includes a facility for file encryption. Unlike *SuperKey*, *SmartKey* doesn't load this facility into memory but keeps it on disk as a separate program until you need it. Another utility kept on disk allows you to permanently redefine the layout of your keyboard, set up one-key operation of the Ctrl, Alt, and Shift keys, turn on the automatic screen blackout and audible key click features, and change the program's type-ahead buffer. Also separate is the configuration utility *SKSETUP.COM*.

This separate-program concept (used by *ProKey* for its layout utility) makes sense. Not only does this save valuable RAM space, it reflects the way most users work. You establish a working environment that suits you and leave it there. If you want to change that environment temporarily during any given work session, there is an Options selection on the program's main menu that lets you do so easily. In the case of file encryption, keeping the function out of RAM lets you use an outside encryption/security system without having a duplicate, unused function eat up your system's memory.

#### Saving the Best for Last

Imagine that you've just finished typing a long, complex string of characters, and now you wish you'd saved them as a macro key for repeated use. With any macro processor but *SmartKey*, you'd have to retype the whole thing. With *SmartKey*, you

## Making a Mess of Your Keyboard

Using the program to reassign keys was simple. The problem was getting it to stop.

Three of the six macro processors tested for this review (*ProKey*, *SuperKey*, and *RE/Call*) permit you to change the layout of the keyboard at will. Of these three, only *RE/Call* allows you to do this at any time while the program is in your system's memory. Both *ProKey* and *SuperKey* use separate keyboard configurator programs for this function. Going to another program to make changes in your keyboard may seem like a nuisance, but there's a good reason why it can be a better approach. Making changes in the program can lead to all sorts of problems.

I accessed the Key Swap facility while attempting to learn each of *RE/Call*'s functions at home. This brought up the program's IBM keyboard display and a one-word prompt at the top of my screen, and nothing else. In this mode, every key you press is swapped with the position of the next key you touch. Every key! I couldn't figure out how to stop it from happening once I had changed a few keys around. Unfortunately, the program's manual was of little help. It said only, "When finished, hit the Esc key." Every time I hit the Esc key, I ended up relocating it to another position.

Normally this is a time to shut the ma-

chine off and start all over again (you can't hit Ctrl-Alt-Del when Ctrl becomes Alt becomes Del, ad infinitum), only I was in the middle of an important file when it happened. To shut my machine off meant losing the file forever. I admit I was dumb, venturing into an unknown RAM-resident function with a file open, but where was the help Yes Software told me about? Why couldn't the program's producers add one little datum—how to get out—to the function's display?

I finally discovered (after having turned most of my keyboard into sinister and unfamiliar territory) that hitting the Esc key when the one-word prompt read "Swap?" (and not when it read "With?") turned the mode off. I could then close the file and reboot to restore my original keyboard. Though the solution sounds obvious now, it wasn't then.

This situation would have been impossible with programs that require you to access the keyboard configurator from the DOS prompt. If it had happened to me in *SuperKey* or *ProKey*, I could have shut the machine off and lost only the new keyboard configuration, not an important file. Sometimes, a little inconvenience can be a blessing.

—David Obregon

simply call up the menu, hit *B* for Buffer, then hit a key combination you want to define. The program automatically recalls the last 64 characters you typed and assigns them to the key combination you've just chosen. You can then edit the new macro with either *SmartKey*'s own editor or with any ASCII editor you choose. Having used it myself to recall a long string of document formatting commands I belatedly wished I'd saved, I can attest to its value. This feature alone may be worth the price of the complete program.

#### RAM Power

As I said earlier, whatever macro processor you decide upon, expect it to

change. If past market experience can be relied on, macro processors evolve more quickly than just about any other category of software. As PCs continue to increase in memory capacity, so will the capabilities of these RAM-resident programs. Indeed, it is not hard to imagine macro processors occupying RAM in divisions of megabytes. Test the programs for yourself (especially new ones that don't yet have extensive lists) to find the best fit, and pay close attention to each program's list of incompatible software. It differs, and your own favorite software might be on it.

No program can be all things to all people. But the producers of macro processor programs will certainly keep trying. ■

TAXAN

600  
SERIES

# Industry Standards Upgraded!

## The Models 630 And 640 Create New Dynamic Standards In Text And Graphics Resolution!

A perfect upgrade/replacement for the standard IBM color graphics monitor and card, the Taxan model 630 and 555 create a higher resolution at a greater savings!

	
IBM Display	TAXAN 630
IBM CGA	TAXAN 555
Color Adaptor	SCG Board
\$924.00	\$896.00
PRICE/PERFORMANCE RATIO	

### 630 Super High Resolution Text and Graphics.

#### Superior Text and Graphics Beyond IBM.

640(H) x 200(V)  
Resolution  
(640(H) x 400(V)  
Non-Interlaced  
Resolution  
available!)

0.37mm Dot Pitch  
24.75KHz Scan  
Frequency  
**100% compatible**  
with IBM PC, XT,  
and AT\* when  
used with the  
Taxan 555 Suggested  
Retail



► Compatible with AT&T 6300 Computer

### RGB Color, and FOUR Monochrome Capabilities in One Monitor!

► No one else offers the monochrome options available with the new Taxan 600 series!

The Taxan 630 & 640 monitors offer Green, Amber, B&W Reverse, and a White on Blue Background as their total spectrum of monochrome options.

Only Taxan offers such a wide variety of monochrome capabilities.



### Total CAD/CAM Compatibility 720 x 400 Resolution!

640

#### The Taxan 640 The Ultimate in Monitor Resolution.

640(H) x 400(V)  
Non-Interlaced  
Resolution  
4,000 Character  
Display Capability  
0.31mm Dot Pitch  
24.75KHz Scan  
Frequency



► Compatible with AT&T 6300 Computer

**100% Compatible**  
with the new  
generation of  
graphics boards  
Taxan (555),  
Persyst B.O.B.®,  
Sigma 400®.

Artist II®, STB 400®  
and others for  
the IBM PC, XT, and AT.  
**\$745.00 Suggested  
Retail**

TAXAN

TAXAN CORPORATION  
18005 CORTNEY CT., P.O. BOX 8698, CITY OF INDUSTRY, CA 91748  
(818) 810-1291 © 1985 Taxan Corporation

\*IBM, IBM PC, XT and AT are registered trademarks of International Business Machines Corp., APPLE II is a registered trademark of Apple Computer Inc., \*TAXAN 555 is a registered trademark of Taxan Corp., \*PERSYST B.O.B. is a registered trademark of Emulex Corp., \*SIGMA 400 is a registered trademark of Sigma Designs, \*ARTIST II is a registered trademark of Color Systems, \*STB 400 is a registered trademark of STB Systems, Inc.

CIRCLE 391 ON READER SERVICE CARD

## EXPANDING EXPANSION OPTIONS:

# Persyst Color Combo



Saving slots: A PC with a 3-in-1 card (left) and with the equivalent IBM boards.

## & Gold Quadboard

Playing Chinese checkers with circuit cards in a PC isn't anybody's idea of having fun. No matter what you might want to put into the different expansion slots, you still have to reserve one each for the video interface and the disk controller. Recently, however, both Quadram and Persyst have used LSI circuitry to build a color/graphics adapter into a multifunction card, freeing the slot once set aside for the video controller. They have also packed many other capabilities onto the same card.

Quadram's Gold Quadboard and Persyst's Color Combo card each contain functions that would occupy four slots on a PC that is fully configured with all-IBM products (in other words, one not using a multifunction card). These boards also save at least one slot over the more typical

PC configuration that does use a multifunction card.

The engineers at Persyst have rolled a complete IBM-compatible color/graphics adapter into a small space on the card and in the remaining room have added a clock/calendar, an RS-232C serial port, a paral-

Quadram's Gold Quadboard and Persyst's Color Combo card each contain functions that would occupy four slots on a PC that is fully configured with all-IBM products (in other words, one not using a multifunction card). These boards also save at least one slot over the more typical

## EXPANSION OPTIONS

lel printer port, and up to 384K bytes of RAM. Designers at Quadram gave their basic board an even wider range of options; then, through piggyback additions, raised the total number of ports to two serial ports and two parallel ports. Plugging in this much functional integration means you can put together a standard PC with two disk drives, color graphics, 640K bytes of RAM, at least two serial and two parallel ports, and a clock—then still have three slots free (one slot is used by the disk controller).

### Slot History

Before we take a look at the two boards, a little background information is in order. The first IBM PCs were designed with an interface that allowed a tape cassette player to be used for program and data storage. Floppy disk drives were optional equipment, hard disks were just dreamed of, and the power supply could put out only 65

### The New "Slot Machines"

	Quadram's Gold Quadboard	Persyst's Color Combo	All-IBM PC (no multifunction board)	"Typical" PC (with multifunction board)
Color/graphics	included	included	\$244	\$244
Serial port	included (second port optional)	included	\$100	\$595 multifunction
Parallel port	included (second port optional)	included	\$75	included
Clock/calendar	included	included	N/A	included
RAM	384K included (640K possible)	384K included	\$565 (256K)	384K included
Total cost	\$795 (kit for optional ports, \$95)	\$895	\$984	\$839
Open slots	3	3	1	2

The Quadram and Persyst 3-in-1 boards compared with a typical multifunction board and an all-IBM configuration.

If You Work With One Of These...  
...You May Be Entitled  
To A Corporate Discount  
On One Of These.



*Creative Computing*. The  
#1 Magazine of Computer  
Applications and Software



*PC*, The Independent  
Guide to IBM  
Personal Computers



*PC Tech Journal*,  
The Magazine for IBM  
PC Experts



*A+*, The Independent  
Guide for Apple  
Computing



### SAVE UP TO 50% WITH THE ZIFF-DAVIS CORPORATE SUBSCRIPTION PROGRAM

Complete and mail this coupon, or for faster service, call  
Daniel Rosenzweig collect at 212-503-5354.

**THE MORE YOU ORDER THE MORE YOU SAVE!**



ZIFF-DAVIS Corporate Subscription Program  
One Park Avenue, 4th Floor  
New York, NY 10016  
Attn: Daniel Rosenzweig

- ☐ YES, I want more information on saving money through the ZIFF-DAVIS Corporate Subscription Plan.  
☐ Please have Dan Rosenzweig call me at:

( )  
Name \_\_\_\_\_ Title \_\_\_\_\_ CA12  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**It's easy to make a copy.  
It's quick.  
It's illegal.  
It's wrong.**

It's hard to believe.

People who wouldn't think of shoplifting a software product on their lunch hour don't think twice about going back to the office and making several illegal copies of the same software.

Making unauthorized copies of software is a violation of Copyright Law. Yet, the problem has reached epidemic proportions because many people are unaware, or simply choose to ignore the law. The software industry is urging decision-makers and software users to take steps to stop software piracy in their organizations. In the meantime, the industry has been forced to prosecute willful copyright violators.

There are legal, moral and economic imperatives forbidding theft of copyrighted software.

There is a free pamphlet on the subject. Call for a copy. A copy. A copy. A copy for everyone. Please ask for Priscilla.



ADAPSO  
1300 North Seventeenth St.  
Arlington, Virginia 22209  
(703) 522-5055

## EXPANSION OPTIONS

watts. Next to the cassette port, IBM engineers put in five expansion slots. In the original IBM marketing scheme, PC owners would buy a separate circuit card for the disk drive control, video interface, se-

rial and parallel input/output ports, and add-on memory. This approach allowed individual systems to be flexibly configured while seemingly ensuring the sale of several relatively expensive IBM circuit

cards with every PC. Potential PC buyers soon discovered that the final cost of their system could easily be double that of the base price when video, memory, and I/O cards were added. PC buyers also found that the expansion slots in a machine with even fairly modest capabilities filled up rapidly.

The IBM PC was released on August 12, 1981. By the end of that month, several new companies, Quadram among them, had formed to take advantage of the high cost and practical limitations in IBM's PC expansion plan. Non-IBM multifunction cards became a standard part of practically every PC installation package. The most common multifunction cards on the market combined memory expansion, a clock/calendar, a parallel port, and a serial port all in one expansion slot. However, it took new LSI techniques to add video and extra RAM. In March of 1983, IBM announced the PC-XT, which has eight expansion slots. Not all of the XT's slots are fully us-

# Lattice® Products Are Your Best Investment

**Lattice TopView Tool-basket**—Provides more than 70 functions that eliminate the need for extensive use of assembly language when interfacing with TopView. Includes functions to control window, cursor, pointer, and printer operations. Also provides access to cut-and-paste facility and debugging services.

**LMK™**—Automated product generation utility for MS-DOS, similar to UNIX "Make"

**C-Sprtle™**—Symbolic debugger for programs written in Lattice C or assembly language

**C Compilers**—MS-DOS and PC-DOS—The industry standard

**Panel**—High performance screen design and screen management system. Available for MS-DOS, PC-DOS, and UNIX systems

**dBC II™ or dBC III™**—C function libraries supporting indexed files that are compatible with dBASE II® or dBASE III™

**C-Food Smorgasbord™** \$150.00  
—Includes a BCD decimal arithmetic package, I/O functions, IBM-PC BIOS interface, terminal independence package, plus many other utility functions

**Text Management Utilities**—(GREP/DIFF/ED/WC/EXTRACT/BUILD)—Essential programming and documentation aids in any environment

With Lattice published products you get "Lattice Service" including telephone support, free updates during the warranty period, notice of new products and enhancements when you register, and a money-back guarantee. Corporate site license agreements are available.

**Call us today for further information on these, or our many other C programs, utilities, and tools!**



Lattice, Inc.  
P.O. Box 3072  
Glen Ellyn, IL 60138  
Phone (312) 858-7950  
TWX 910-291-2190

## We practice portability

### International Sales Offices

**Benelux:** De Voight. Phone (32) 2-720.91.28.  
**England:** Roundhill. Phone (0672) 54675  
**Japan:** Lifeboat Inc. Phone (03) 293-4711



## Gold Quadboard

Quadram Corporation  
4355 International Blvd.  
Norcross, GA 30093  
(404) 923-6666

**List Price:** With 384K RAM, \$795; expansion kit with second serial and parallel ports, \$95

**Includes:** IBM-compatible color graphics, clock/calendar, serial port, parallel port (second ports optional), *Keysaver* recovery and recording firmware, *PolyWindows Desk Plus* utility software, up to 640K RAM, RAMdisk, and print spooler.

**CIRCLE 676 ON READER SERVICE CARD**

## Persyst Color Combo

Persyst Division  
Emulex Corporation  
3545 Harbor Blvd.  
Costa Mesa, CA 92626  
(714) 662-5600

**List Price:** With 384K RAM, \$895  
**Includes:** IBM-compatible color/graphics, clock/calendar, serial port, parallel port, up to 384K RAM, RAMdisk, and print spooler.

**CIRCLE 675 ON READER SERVICE CARD**

CIRCLE 133 ON READER SERVICE CARD





Congratulations.  
You're qualified to operate the Hewlett-Packard  
1/4" Tape Backup System.

It's really that easy. In fact, the HP Tape Backup system, with its menu-driven software, can be mastered in a few minutes.

Then, if you ever lose a file accidentally or your system goes down, your data will always be safe.

The HP Tape Backup is compatible with



**HEWLETT  
PACKARD**

IBM right down the line, including the IBM PC, PC-XT, and PC-AT. And it's easy to install. There's only one thing simpler than the HP Tape Backup: finding out more about it.

For literature and the dealer nearest you call (800) FOR-HP-PC. Ask for Dept. 709E.

**BUY HARDWARE AND SOFTWARE AT WHOLESALE +8%,  
AND GET 14-30 DAY SOFTWARE RENTALS†...**

Listed below are just a few of the over 20,000 products available at our **EVERYDAY LOW PRICES!**

## COMPLETE SYSTEMS

(Optional local warranty service available in most major metro areas)

### IBM PC BASE SYSTEM

IBM PC w/256K  
Floppy Drive Controller  
2 Double Sided Double  
Density Disk Drives

**\$1,495.02\***



### IBM PC HARD DISK SYSTEM

IBM PC w/256K  
Floppy Drive Controller  
1 Double Sided Double  
Density Disk Drive  
Half Height 10MB  
Disk Subsystem

**\$1,749.00\***

CALL FOR  
LATEST IBM  
ANNOUNCEMENTS

CUSTOM  
CONFIGURATIONS  
WELCOME

**COMPAQ**™

### PORTABLE HARD DISK SYSTEM

w/256K/1 Floppy/Hard Disk



**\$2,255.00\*** w/10MB

**\$2,429.00\*** w/20MB

### DESKPRO SYSTEM WITH TAPE BACKUP

640K CPU/1 Floppy/Hard Disk  
10MB Tape Drive/Monitor



**\$2,951.94\*** w/10 MB

**\$3,151.94\*** w/20MB

Wholesale Prices Change Rapidly...If you ever see a lower price advertised anywhere please call! You will find the Network's Price will always be the best!

### 64K IBM PC MEMORY EXPANSION KITS

Quantity Discounts Available.  
Guaranteed for Life!



Quantity of 100 Sets  
**\$3.96\*** per set  
Set of 9 Chips  
**\$5.40\***

### BRAND NAME DISKETTES

DS/DD Box of 10 Guaranteed for Life! Not Generic

**\$8.95\***

### DS/DD Bulk Pack Special

Packaged in 50 Guaranteed for Life!

**.79\***

### 1/2 HEIGHT DS/DD DISK DRIVES



The Network buys direct and makes fantastic deals with manufacturers like Seagate/Conquest/Quantum/TEAC/4-tech and others to bring you fantastic prices on Name Brand drives for your VCI/KIT/1 or compatible.

**\$69.00\***

Quantity Discounts Available.

### INTERNAL PC HARD DISK

Low Power/Automatic Boot Works on standard PC's and Compaqs. Includes drive/controller/cables/mounting hardware and instructions.



Full one year warranty!

**\$350.00\***

**\$440.00\***

Quantity Discounts Available.

**MultiMate**™

Professional  
Word Processor  
**\$200.00\***

**\$265.00\***

\*Members pay 8% above this wholesale price plus shipping.

CALL TOLL FREE 1-800-621-S-A-V-E (orders and memberships)

In Illinois call (312) 280-0002 Validation code: A127

TM—Registered trademark of IBM and COMPAQ

## IN NETWORK

### ... WITH THESE 15 UNIQUE BENEFITS

**1 COST + 8% PRICING**—The NETWORK purchases millions of dollars in merchandise each month. You benefit in receiving the lowest price available and all at just 8% above published dealer wholesale price.

**2 OUR 600 PAGE WHOLESALE CATALOG**—Members receive our 600 page wholesale catalog containing over 20,000 hardware and software products for the IBM PC, APPLE and over 50 other popular computer systems. The NETWORK CATALOG IS THE LARGEST SINGLE COMPILATION OF PERSONAL COMPUTER PRODUCTS AVAILABLE TODAY. NOW UPDATED QUARTERLY!

**3 IN-STOCK INSURED FAST HOME DELIVERY**—The NETWORK maintains a giant multi-million dollar inventory of most popular products, allowing us to ship many orders from stock. Non-stock items are typically manufactured at warehouses just days away from THE NETWORK and YOU. We pay all insurance expenses on your shipment. EMERGENCY OVER-NIGHT SERVICE IS AVAILABLE ON REQUEST.

**4 10 DAY RETURN POLICY**—If you are not satisfied, for any reason with any hardware component purchased from THE NETWORK within 10 days of receipt, we will refund your entire purchase (less shipping) with no questions asked.

**5 MEMBERSHIP SATISFACTION GUARANTEE**—If for any reason you are not satisfied with your membership within 30 days, we will refund your dues IN FULL.

**6 EXPERIENCED CONSULTANTS**—The NETWORK hires consultants, not order takers, to aid you in product selection. Our consulting staff possesses in excess of 150 man years of personal computer product experience. We back our consultants with our money back guarantee. IF ANY PRODUCT RECOMMENDED BY OUR CONSULTING STAFF FAILS TO PERFORM AS PROMISED—WE WILL TAKE IT BACK AT OUR EXPENSE FOR A 100% REFUND.

**7 FREE TECHNICAL SUPPORT**—The NETWORK supports every product it sells. Our qualified TECH-SUPPORT staff will help you assemble your system, interpret vendor documentation and get your software and hardware to work. WE WILL GIVE YOU ALL THE HELP YOU NEED, WHEN YOU NEED IT—FREE!

**8 OPTIONAL BUSINESS RENTAL LIBRARY**—All members can join our BUSINESS RENTAL LIBRARY featuring over 1000 available titles for just \$25 PER YEAR above the base membership fee. This entitles you to rent business software AT JUST 20% of the DISCOUNT PRICE FOR A 14 DAY PERIOD. If you decide to keep the software, the entire rental fee is deducted from the purchase price. VIP MEMBERS GET A FULL 30 DAYS for just \$30 above the V.I.P. base fee. This also includes the game library privileges for a \$5 combination savings.

**9 OPTIONAL GAME SOFTWARE RENTAL LIBRARY**—The Game Rental Library is available to members for just \$10 PER YEAR and permits evaluation (or just enjoyment) of any game or educational software product as above.

**10 SPECIAL SAVINGS BULLETINS—THE PRINTOUT**—Issued Quarterly or no charge to Network members only! The Printout contains all the New Product listings and price changes you need to keep your Catalog up to date. Also, we buy excess dealer inventories and store bankruptcy closeouts, which we turn around and make available to our members at fantastic savings via THE PRINTOUT.

**11 DISCOUNT BOOK LIBRARY**—Working with numerous publishers and distributors, THE NETWORK has assembled a library of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

**12 MEMBERSHIP REFERRAL BONUS**—Our most valuable source of new members is via you! To date, more than 40% of our members have been referred by word of mouth from other satisfied members. For those of you who refer new members, THE NETWORK will credit a cash bonus to your account applicable to any future purchase.

**13 CORPORATE ACCOUNT PROGRAM**—Almost 50% of THE NETWORK's members are corporate buyers and users (see opposite page left). THE NETWORK can establish open account status and assign designated account managers to expedite orders, and coordinate multiple location shipments.

**14 QUANTITY DISCOUNTS**—For large corporations, clubs, and repeat or quantity buyers THE NETWORK can extend additional single order discounts, when available to us from our manufacturers and distributors.

**15 PRICE PROTECTION**—The PC industry is crazy! Prices change not yearly or monthly or even weekly but often daily! These changes are sometimes up but are mostly down!! THE NETWORK GUARANTEES THAT IN THE EVENT OF A PRODUCT PRICE REDUCTION, BETWEEN THE TIME YOU PLACE YOUR ORDER AND THE TIME THE PRODUCT SHIPS YOU WILL ONLY PAY THE LOWER AMOUNT!!

CIRCLE 207 ON READER SERVICE CARD

**DISCOUNT MICRO SALES, INC.**

We  
Welcome  
Corporate  
Accounts

*We'll Beat  
Any Price!*

**\* Free  
Shipping**

**CALL TOLL FREE 1-800-MICRO SL / 1-800-642-7675**

**FEATURED  
SPECIALS**

**BORLAND  
SIDEKICK** **rBASE 5000**  
**\$29 \$379**

**PFS: FILE,  
GRAPH, PLAN  
OR WRITE**  
**\$82**

**THINK TANK**  
**\$99**

**MODEM:  
HAYES** **PRINTER:  
1200B** **1090-\$199**  
**\$329 1091-\$299**

**BOARDS:  
HERCULES,  
COLOR-\$159**  
**GRAPHICS \$299**

*Software*

	LIST PRICE	OUR PRICE
<b>ASHTON TATE, rBASE III</b> .....	695	364
<b>BORLAND INTERNATIONAL</b>		
Sidekick (Protected) .....	55	29
Sidekick (Non-protected) .....	85	49
<b>BRODERBUND SOFTWARE</b>		
Bank Street Writer .....	80	49
<b>BPI SYSTEM</b>		
Job Cost Accounting, Inventory		485
General Acct., AR, AP or FR .....	595	365
<b>Funk Software, Sideways</b> .....	60	39
<b>Fox &amp; Geller, Quickcode II or Quickcode III</b> .....	295	154
dGraph II or dGraph III .....	295	154
dUnit III .....	99	59
<b>Harvard Total Project Manager</b> .....	495	264
<b>SORCIM/IUS, Easy Writer</b> .....	350	196
GL, AR, AP, OE, Inventory .....	595	298
<b>LIFETREE, Volkswriter deluxe</b> .....	295	159
<b>LOTUS, 1-2-3</b> .....	495	CALL
<b>LOTUS, Jazz</b> .....	595	375
<b>MECA, Managing Your Money</b> .....	200	114
<b>MICROPRO, Wordstar 2000</b> .....	495	255
Wordstar 2000+ .....	595	295
<b>MICROCRIM, rBASE 5000</b> .....	700	379
<b>MICROSOFT, Word</b> .....	375	229
Multiplan .....	195	119
<b>MICROSTUFF, Crosstalk</b> .....	195	94
<b>MONOGRAM, Dollar &amp; Sense</b> .....	180	104
<b>MULTIMATE</b> .....	495	239
<b>PEACHTREE SOFTWARE, all systems</b> .....	CALL	CALL
<b>PETER NORTON, Utilities</b> .....	100	58
<b>SOFTWARE ARTS, TK Solver</b> .....	400	244
<b>SOFTWARE GROUP, Enable</b> .....	695	389
<b>SOFTWARE PUBLISHING</b>		
PFS: Report .....	125	74
PFS: File, PFS: Plan, PFS: Graph, or PFS: Write .....	140	82
PFS: Proof .....	95	59

*Hardware*

	LIST PRICE	OUR PRICE
<b>ACCESSORIES</b>		
CH PRODUCTS, Mach III w/Fire Button .....	55	36
KOALA, Touch Tablet w/Software .....	150	94
KENSINGTON, Masterpiece .....	150	94
PC Saver Line Cord w/Filter .....	50	34
MOUSE SYSTEMS, PC Mouse & PenIt .....	220	139
MEMORY CHIPS, CABLES, POWER BACKUPS, CLEANING KITS, COVERS, PAPER, PROTECTORS, FLOPPIES, etc. ....	CALL	CALL
<b>BOARDS</b>		
AST, Mega Pak (256k) .....	495	349
AST, Advantage (128k) .....	595	409
HERCULES, Color .....	245	159
HERCULES, Graphics .....	499	299
QUADRAM, Quadboard (256k) .....	595	349
PARADISE, 5 pack .....	229	164
TECMAR, Captain Multifunction (64k) .....	289	199
<b>COMPUTERS</b>		
IBM, APPLE, COMPAQ others, .....	CALL	CALL
<b>HARD DISKS</b>		
MAYNARD, 20 mb int. w/Cont Roller .....	1400	894
LOWE, TALLGRASS, CORVUS, others, .....	CALL	CALL
<b>MODEMS</b>		
HAYES, Smartmodem 1200b .....	489	354
Smartmodem 1200b (w/Smartcom II) .....	549	369
Smartmodem 2400 .....	899	629
PROMETHEUS, Promodem 1200b .....	375	259
Promodem 1200 .....	495	329
<b>MONITORS</b>		
AMDEK, 310a (Amber) .....	230	149
Color 300 .....	349	244
Princeton Graphics, Taxan, Quadram, etc. ....	CALL	CALL
<b>PRINTERS</b>		
PANASONIC, P1090 .....	349	209
P1091 .....	399	299
TOSHIBA, P1340 (144cps) .....	799	619
P51 (288 cps) .....	1900	1369
EPSON, OKIDATA, NEC, many others .....	CALL	CALL

**Call For Over One  
Thousand Additional  
Items**

Products listed for IBM PC only. Call for Apple and other Micro Systems.

**Low Prices, Fast and Friendly Service.**

\*Free UPS shipping on all orders over \$700 (printers and monitors may be extra, call for details)

ORDERING INFORMATION AND TERMS:

\* Prompt UPS service • No surcharge for credit cards • Visa, Mastercard and American Express orders processed same day • Price guarantee - We'll beat any price in this magazine with same terms - call toll free • Allow 2 to 3 weeks for checks to clear • Full guarantee against manufacturers defects • Prices may change • Authorized purchase orders and C.O.D. accepted

**Discount Micro Sales, Inc.**  
6900 East Indian School Road  
Scottsdale, AZ 85251

For Faster Service Call Toll Free  
1-800-MICRO SL or 1-800-642-7675  
Arizona Resident or for Customer Service Call 602-947-2808

AD#  
E12

CIRCLE 109 ON READER SERVICE CARD

**Orders Shipped  
Within 24 Hours  
of Receipt**



## EXPANSION OPTIONS

able for every application, and they're jammed together with less spacing than exists on a standard PC. However, the XT does represent a step forward in expansion capability.

### Fine Differences

The Gold Quadboard's flexibility—plus its bundled software—make it a clear winner if you want to take a standard PC to its maximum. However, trying to insert the Quadboard into one of those narrow XT slots takes some finesse. Persyst's Color Combo, on the other hand, while difficult to use on an early model PC, is a good choice for an XT that you want to load with

The Gold Quadboard's flexibility—plus its bundled software—make it a clear winner for the standard PC.

expansion cards. The accompanying table compares these two boards against a PC configured with all-IBM products (using no multifunction card) and a more typical PC configuration that does use a multifunction card.

### The Gold Quadboard: A Solid Gold Hit

Quadram's Gold Quadboard—the latest in a long line of Quadram add-on products for the PC—is an excellent way to upgrade or equip a PC. Set off with gold masking on the circuit card, it has aesthetic appeal besides sound technical design. In fact, Quadram has put so much work into the development of the Gold Quadboard that it offers a lifetime warranty on boards shipped with a full load of Quadram-installed memory.

Moreover, Quadram has loaded the Gold Quadboard with accessory software—there's enough to just about fill even its own spacious RAM. It comes with a graphics program, *Keysaver* firmware, a windowing environment, and assorted RAMdisk, print buffer, and clock interface programs.

### What It Gives You

The Gold Quadboard main circuit card holds a video, a parallel printer port, spe-

*the CopyCover* (Patented)  
THE PERFECT COMBINATION — DUSTCOVER & COPYHOLDER

\$19.95

#### FLIP IT UP ...

- Holds all copy at the proper viewing angle.
- Increases typing speed and accuracy.
- No straining to the side to read text.
- Makes desk space more efficient.



#### FLIP IT DOWN ...

- Saves money by protecting keyboard from harmful dust and dirt.
- Takes the place of traditional plastic "covers" that are unsightly to look at and difficult to hide.
- Quantity discounts.
- Dealer & OEM inquiries invited.

CLIPS ON AND OFF IBM PC, AT OR XT KEYBOARD IN SECONDS.  
MANUFACTURED IN BEAUTIFUL, CLEAR ACRYLIC

Send check or m.o. to C-THRU Products, Inc.  
6351 Lake Worth Rd., Suite 111  
Lake Worth, FL 33463 (305)439-4333

Add \$3 shipping and handling per unit. Florida residents add 5% tax.

**C-THRU**  
PRODUCTS, INC.

CIRCLE 118 ON READER SERVICE CARD

## Operate your office PC from home ...



Use the power of your office-bound PC at home or on the road ... all you need is REMOTE.

Whatever PC power you may need, spreadsheet, DBMS, word processor, can be yours. All you need is a portable computer or terminal and a modem. REMOTE provides password protection for each user.

Leave your PC in the office ... but pack the power to go. REMOTE.

**REMOTE**<sup>TM</sup>

**MICROSTUP**<sup>®</sup>

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

CIRCLE 212 ON READER SERVICE CARD

# TEK COMPUTERS

TELEPHONE: (408) 296-0456

## THE ULTIMATE SOLUTION FOR YOUR COMPUTER NEEDS

### HARDWARE

IBM Enhanced Adapter (AT)	459
IBM Monochrome Card	245
IBM Color Card	229
Hercules Graphic Card	315
Hercules Color Card	
w/Parallel Port	149
Genoa Color & Mono Card	335
AST Sixpak + w/64K	245
Quadram w/OK	207
AST Advantage For AT	488
AST Game Port	46
Hayes 1200	425
Hayes 1200BW/Software	385
Hayes 2400	645
Serial/Parallel Card	69/79
Set of 64K	18.00
Set of 128K	75.00
Set of 256K	80.00
8087 CoProcessor	150.00
80287 CoProcessor (AT)	325.00
CompuGuard	45.00
Tecmar Graphic Master	485.00
Tecmar Captain	240.00

### HARD DISKS/ DISK DRIVES

CMII 40 MB for AT	1200
Atasi 51 MB for AT	1650
10 MB Sub System	625
20 MB Sub System	900
Teac 1/2 Ht. Dr.	95
Panasonic 1/2 Ht. Dr.	100
IBM Full Ht. Dr.	125
Emerald (High Density) HD	Call
Omega Bernoulli Box 20 MB	2550
10 MB Cartridge	50

### SYSTEMS

IBM AT Enhanced	4200
IBM AT Basic	3000
IBM XT 256K, 10 MB HD	2400
IBM XT 256K, 20MB HD	2650
IBM PC 256K, 2 1/2 Ht. Drive	1525
IBM PC 256K, 10MB HD	2175
IBM PC 256K, 20MB HD	2395
COMPAQ 128K 1 Drive	1750
COMPAQ 215K 2 Drive	1900
COMPAQ 128K Potable	1750
COMPAQ 256K 2 Drive (Potable)	1750
COMPAQ 256	Call

### MONITORS/ PRINTERS

IBM Enhanced Monitor	690
IBM Color Monitor	560
IBM Mono Monitor	245
PGS HX-12 color	460
PGS MAX 12 Mono	179
Amdek 310 A	170
Epson FX 85 Printer	380
Epson FX 185	575
Okidata 192	375
Okidata 193	585
Toshiba 1351	1250
Toshiba 1340	590
IBM Pro Printer	485
Okidata 93P (Standard)	560
Toshiba 1351	1250
Toshiba 1340	599
Alpha Com Daisywheel	390
Brother HR-25	545

### SOFTWARE

IBM DOS 2.1	60
IBM DOS 3.0/3.1	65
Lotus 123	290
Symphony By Lotus	429
Framework	340
dBase II/III	289/365
SuperCalc III	235
Harvard Total Project	279
WordStar	215
WordStar 2000/2000+	260/315
WordStar ProPak	280
MS Word with Mouse	299
Ultimate	269
Word Perfect	265
Samna Word II/III	275/350
PC Paint Brush/Mouse	175
Accounting Package	Call
Turbo Pascal 3.0	49
Side Kick (NCP)	69
Desk Organizer	85
Cross Talk XVI	129
Chart Master	325
Sign Master	199
MS Mouse w/Software	Call
MS Serial Mouse w/Software	Call
PFS File/Graph	84
PFS Plan/Write	89
MS Flight Simulator	36

#### All Prices Are Subject To Change Without Notice.

We also carry other hardware, software and peripherals for IBM, Apple, Compaq etc.

California residents add sales tax.

Shipping: Add \$5.00 for UPS Surface, \$9.00 for UPS Blue For Systems, Printers and Monitors, charges will be quoted at the time of order.

### TEK COMPUTERS

ADDRESS: 2740 El Camino Real, Santa Clara CA 95051

HOURS: Mon. - Fri: 8 AM - 6 PM (PST)

Sat: 10 AM - 5 PM (PST)

TELEX: 298055 (CYBYTE U.R.)

FOR TECH SUPPORT (408) 296-0455

INTERNATIONAL INQUIRIES WELCOME



## EXPANSION OPTIONS

cial *Keysaver* integrated circuits, and up to 640K bytes of expansion RAM. A small daughter board that mounts on to the back of the main circuit card—part of the standard package—contains a serial port and a clock/calendar. You can purchase an additional kit containing controller chips that plug into the daughter board, giving the combination another serial port and a second parallel port.

Connectors for the printer port and RGB video are on the rear of the circuit card. The Gold Quadboard, however, does not provide a standard composite video output jack. Although composite video is available, it requires a special cable connection.

A separate bracket containing three IBM standard connectors for the two serial ports and second parallel port mounts on the back of the PC. If the second serial port is installed, the cable going to this connector will probably force you to mount the Gold Quadboard in one of the three left-most expansion slots. This should not be a limitation.

The battery for the clock and RAM backup used on the Gold Quadboard is mounted in a clip and can be easily replaced. All options for the memory, clock, video, and other devices are selected by manipulating two banks of DIP switches mounted on the top of the card; changes can be made without removing the card from the system.

The Gold Quadboard has three banks of memory, each of which can be filled with either 64K-bit or 256K-bit RAM chips. This means that you can configure the Gold Quadboard with 0, 64, 128, 192, 320, 384, 512, 576, or 768K bytes of expansion RAM in addition to the RAM already on the PC's main circuit board (64 or 256K bytes). Since most PCs in use today can address only 640K bytes of memory, the upper memory limits are probably not very useful now. But the flexibility of the Gold Quadboard's memory enhancement scheme allows you to pile in all the memory you can use and still have room for additional RAM expansion in the future. Moreover, the ability to flexibly address the Gold Quadboard's memory means that it can be used with older PCs carrying only 64K bytes on the motherboard, or even with machines such as the Zenith Z-150

## You erased your PC's data. Get it back with The Norton Utilities.™



*Peter Norton has been rescuing PC data since he first wrote The Norton Utilities in 1982*

It happens. Maybe you're working too late. Maybe your PC's keyboard is looking like unfamiliar territory. Press delete when you don't mean to and a whole week's worth of input data is history.

The Norton Utilities are powerful organizational tools designed for the IBM PC and DOS compatibles. With a remarkable file recovery feature called UnErase, you can actually search for and restore lost data with a few simple commands.

The Norton Utilities are great for daily disk management tasks, too. You can locate files, track down data, and put disks in order. You're organized! And with UnErase, you're insured against costly mistakes.

**TIME-LIFE  
ACCESS  
NEWSLETTER**  
says "Highly  
recommended for  
business users."

**THE NORTON  
UTILITIES**  
DATA RECOVERY  
DISK MANAGEMENT

Santa Monica, CA 90403. 213-399-3948. Visa and Mastercard welcome.



A life saver for your data.

CIRCLE 346 ON READER SERVICE CARD

## PC power ... anywhere.



REMOTE lets you use all of your PC software from the other end of a telephone line ... wherever that might be!

All you need is a terminal or portable microcomputer, a modem, and a phone line. You can call into the host microcomputer, access it, and run most popular programs, including word processors, spreadsheets, and database managers. You'll see the program in operation just as if you were sitting in front of the host computer.

REMOTE's powerful electronic mail system rivals those found on mainframes, with full password protection. Why leave your PC power in the office ... when you can give it a call with REMOTE?

**MICROSTUP®**

**REMOTE™**

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

CIRCLE 215 ON READER SERVICE CARD



## EXPANSION OPTIONS

that might come with no system memory whatsoever.

### The Big Squeeze

However, if you are going to use the Gold Quadboard to upgrade an IBM PC XT, keep in mind that adding a daughter board turns the Gold Quadboard into a chubby card. Since the slots in the XT are quite narrow, you might run into trouble if you try to mount a Gold Quadboard next to anything but a skinny card with no high electrical components on it.

### Compatibility

The video and I/O portions of the Gold Quadboard run just like the IBM originals. The video and communications controllers are the same as the ones on IBM cards, and you can use a lightpen with the video section of the Quadboard. It's also reassuring to find that the same color palettes and character sets available in the IBM color/graphics adapter are used in Quadram's product. There are a few LSI chips with the Quadram name on them, but the circuits appear to follow completely the IBM

architecture. *Flight Simulator*, 1-2-3, *Word Vision*, and several communications programs all run exactly as they do with IBM hardware in place.

### Crisis Control

The Gold Quadboard comes with a special feature called *Keysaver*. *Keysaver* is a firmware function built into the card that gives you a unique capability to recover from normally catastrophic failures and errors. *Keysaver* is like a recording machine operating quietly in your PC. It records

# HELP YOUR KIDS MAKE THE GRADE.



Now there's a way parents can help their children climb to the heights of success.

It begins with an Apple,\* IBM® Commodore™ or Atari® computer. It takes off with CBS Software.

Our *Success with Math™* series has met with sales success second to none in its field. Along with our new *Success with Algebra™* series, your home computer will become a patient, private tutor—using serious drill and practice to help your children over the obstacles in their way.

*Mastering the SAT* has also become a best seller. With its counterpart, *Mastering the ACT*, it's the comprehensive test preparation program that's proven to be the first choice for thousands of students who want acceptance from their first choice college. They are the only programs of their kind created with the National Association of Secondary School Principals. And they're designed to provide the competitive edge that can help put your kids over the top.



**CBS  
SOFTWARE**  
Making you the best.

IBM, Apple and Alan are registered trademarks of International Business Machines Corp., Apple Computer Inc. and Atari Corp. respectively. Commodore is a trademark of Commodore Electronics Ltd.  
© 1990 CBS Inc. All rights reserved. CBS Software, A Unit of CBS Educational and Professional Publishing Division.  
CBS Inc., One Fairchild Place, Greenwich, CT 06830 (203) 622-2525

**IF YOU'RE INTERESTED IN GIVING YOUR CHILDREN THE BEST, CALL 1-800-CBS-ASK4 FOR THE DEALER NEAREST YOU.**



Call  
Toll Free  
1-800-531-5475

# CompuAdd

"Computers & Add-On Products"

**All Prices Include Free Shipping!!!**

## Mercury Hard Disk for the IBM PC

10 MB	
INTERNAL	EXTERNAL
<b>\$395</b>	<b>\$545</b>
Qty. 2 <b>\$385</b>	Qty. 2 <b>\$530</b>

20 MB	
INTERNAL	EXTERNAL
<b>\$495</b>	<b>\$645</b>
Qty. 2 <b>\$485</b>	Qty. 2 <b>\$630</b>

Convert your PC to an XT with our Mercury hard disk kits. Complete with hard disk controller, cables, manuals, mounting hardware and easy-to-use software.

Plus a one year warranty!

30 MB	
INTERNAL	EXTERNAL
<b>\$795</b>	<b>\$945</b>
Qty. 2 <b>\$770</b>	Qty. 2 <b>\$930</b>

1 Year  
Warranty!

## Mercury Hard Disk for the IBM AT™

Enhance your basic IBM AT with our state-of-the-art Mercury AT hard disks. Complete with cables, manuals, and mounting rails. Includes a one year warranty!

Mercury AT-20

**\$559**

Mercury AT-30

**\$729**

## Hard Disks for the COMPAQ Portable

10 MB 20 MB

**\$475 \$629**

## Mercury Tape Back-up by



**\$395**

## AST SixPakPlus

The World's best selling multifunction board for IBM PC. Complete with 384K Memory, serial port, parallel port, and electronic disk and print buffer software.

**\$259**

## AST Advantage! w/128K



PC AT multifunction expansion board offering up to 1.5 MB of Memory, serial port and parallel port.

**\$399**

Teac  
55B

Half  
Height

**\$99**



Memory

1 Year Warranty  
9 Chips per set



64K..... **\$6**

256K.... **\$39**

Intel

Math Co-Processor



8087 .... **\$98**

80287.. **\$219**

360K Floppy Drive  
for the IBM AT



**\$119**

# Corporate & Institutional Accounts Welcome...

## STANDARD BRAND PRODUCTS

All Standard Products  
Have A 2 Year Warranty!

**Standard MFC**  
Multifunction Card  
w/384K



- Parallel Port
- Game Port
- Software
- Memory Expansion
- Clock Calculator
- SerialPort

**\$145**

**Standard 5151**  
Keyboard



- Quiet Soft Touch
- 5151 Sony Keyboard
- Compatible With IBM PC & XT

**\$129**

**Standard AT-Vantage**  
IBM AT Memory  
Expansion Board



- OK 1.5 MB
- Serial Port
- Parallel Port

w/O K **\$299**

**IBM**

PC's & AT's

Call for Price\$\$\$

### Printers

#### EPSON

LX 80.....	\$229
FX 85.....	\$379
FX 185.....	\$499
LQ 1500.....	\$929

#### Okidata

OKI 192.....	\$365
OKI 193.....	\$569

#### NEC

NEC e+e+.....	\$459
Printer Cables.....	\$25

### Power Products

135 Watt Power Supply ..... **\$95**

#### MINUTE MAN™

- Blockouts
- Interruptions
- Blowouts
- Surges
- Solves
- EMI/RFI

**Minuteman 250**  
250 watts output  
power capability..... **\$399**

**Minuteman 500**  
500 watts output  
power capability..... **\$549**

### Boards

#### AST Research

Preview	
Monochrome graphics.....	\$279
<b>Standard Brand</b>	
Floppy Disk Controller.....	\$89

#### Hercules

Monochrome	
Graphics Card.....	\$309
Color	
Graphics Card.....	\$165

### Monitors

#### Princeton Graphic Systems

HX 12	
Color Monitor.....	\$475

Amdek 310A	
Monochrome Display.....	\$175

Amdek 300A	
Amber Composite Display.....	\$159

Quadram Amberchrome	
Amber Monochrome	
Display.....	\$175



### Hayes Smartmodems

300	\$159
1200B	\$359
1200	\$389
2400	\$699

### Diskettes

CDC D/S	\$15
3M D/S	\$28
3M S/S	\$19
Verbatim D/S	\$28
Verbatim S/S	\$19
Maxell High Density for IBM AT	\$49

### Software

MicroPro WordStar Pro Pak	\$259
MicroPro WordStar 2000 +	\$315
MicroSoft Word	\$259
Ashton-Tate Fugawork	\$379
Borland TurboPascal	\$39
Crosstalk XVI	\$129
Hayes Smartcom II	\$110

### Misc.

MasterPiece by Kensington Microcave	\$109
Keytronics KB5151 Deluxe Keyboard	\$189
Rolltop 100 Diskette Holder	\$29

RETAIL OUTLET  
3042 8th  
Austin, Tx 78701  
512-479-7174

RETAIL OUTLET  
2804 Ben Canby Rd  
Austin, Texas 78756  
512-327-4825

RETAIL OUTLET  
1200A Research Blvd  
Austin, Texas 78758  
512-386-5844

RETAIL OUTLET  
5120 Bandera Rd, Suite 14  
San Antonio, Texas 78216  
512-356-9016

RETAIL OUTLET  
437 S McCarty Rd  
San Antonio, Texas 78216  
512-325-1185

**Our Policy:** All prices include fully insured, UPS ground shipping, on all orders shipped in continental U.S.A. No surcharge for VISA, MasterCard or UPS COD payments (Minimum purchase of \$50 on COD & net terms orders). We accept 10% off on institutional purchase orders on a net terms basis (with credit approval) at no additional charge. Allow 7 days for personal check and company checks to clear.

Add 6 1/8% sales tax if a Texas resident. Prices are subject to change. All equipment carries a new factory warranty. All returned items must be accompanied by a return authorization number and subject to a restocking fee.

**Corporate & Institutional Accounts Welcome:** Our national accounts division is dedicated to providing the prompt professional service required to keep your business running smoothly. We accept P.O.'s on a net terms basis, (minimum order \$50 please) offer next day shipping, free fully insured UPS ground shipping. We offer a full-time technical staff to answer any questions that might arise and to make fast repairs if needed. You'll notice the difference.

For product information, price quotes, technical support and orders call:  
(800) 531-5475 (outside Texas) (512) 250-1489 (within Texas)



**CompuAdd** Corp.

12503-G Technology  
Austin, Tx 78727



CIRCLE 228 ON READER SERVICE CARD

1-800-531-5475  
Call Toll Free

## EXPANSION OPTIONS

mouse and retails for \$100. The normal Gold Quadboard package also includes a multifunction utility called *PolyWindows Desk Plus*.

*PolyWindows Desk Plus* consists of a

document editor, file card deck, a keyboard enhancer that redefines single keys to perform multiple keystrokes, a calendar, an alarm clock with chimes, an appointment book, a printing calculator, a

telephone dialer, a grabber for importing and exporting text—and a puzzle just for the fun of it. All of these utilities reside in RAM and can be called with a single keystroke.

Finally, Quadram's Quadmaster utilities are the third generation of RAMdisk, clock interface and management, and print-spooling software. Quadram's RAMdisk has always been my favorite because it doesn't require you to set aside any RAM with the system switches. You can make the RAMdisk as big or as little within the limits of PC DOS as you need it to be and change the size of the disk on the fly. The print spooler has many features—including the ability to redirect output to various printer ports and to reprint spooled documents.

### Documentation

Quadram's documentation for the accessory software and *Quadpoint* is excellent. Because of all of its functions, the *PolyWindows Desk Plus* manual is thick, but the program itself is intuitively easy to use. The documentation for the Gold Quadboard itself does a good job explaining its installation and use, but programming information for the video card and I/O ports was not as detailed as that in IBM manuals. As expressed earlier, more details on the *Keysaver* firmware feature would have been interesting and useful.

### Persyst's Color Combo: Fit for an XT

The Persyst Color Combo card occupies one full-length expansion slot. A single-sided card that has no problem fitting into the narrow expansion slots in a PC XT, it, too, bears some familiar elements: The 6845 video controller and 8250 communications controller are the same chips that IBM uses on its video and communications cards, and a light pen can be connected to the Color Combo the same way it is connected on the IBM card. However, Persyst uses its own color display driver and parallel printer controller integrated circuits to reduce the chip count and space requirement on the board. As a matter of fact, even with all of its functions, the Persyst card has fewer chips on it than my very old IBM color/graphics adapter card.

The clock on the Persyst card is a standard integrated circuit with its own re-

## A NEW KIND OF COMPUTER STORE

### ★ WE DISCOUNT EVERYTHING ★

#### OKIDATA

OKIDATA 192	349.95
OKIDATA 193	499.95
OKIDATA 84	649.95
OKIDATA 80	829.95

#### NEC

EU-360	449.95
2050	619.95
3550	999.95
8850	1429.95

BROTHER HA 15	369.95
BROTHER HA 25	499.95
BROTHER HA 35	749.95
SILVER REED 550	399.95
SILVER REED 770	779.95

#### Hayes

2400 RS232	599.95
1200 RS232	399.95

★ 1200 B INTERNAL	349.95
PROMODEM 1200B IBM	269.95
PROMODEM 1200	299.95
SIDELINK	39.95
TURBO PRICIL	49.95
SUPER MEV	54.95
PRINTSHOP	39.95
PRINTMASTER	44.95
ART GALLERY	34.95
MANAGING YOUR \$	109.95
NEWSROOM	34.95
CLIP ART	19.95
DBASE III	369.95
PARAWORK	369.95
COPY II PC	29.95

#### EPSON

EPSON FX 85	349.95
EPSON FX 185	489.95
EPSON LX 80	229.95
EPSON LX 80	489.95
EPSON LQ 1500	879.95

#### PANASONIC

1091	249.95
1092	379.95

TOSHIBA 1340	549.95
TOSHIBA 1351	1079.95
TOSHIBA 351	1095.95

#### Lotus 123

★★★★ SYMPHONY	409.95
FONTRIX	99.95
FONTPRIMS 1 THRU 11 EA	19.95
GATO	29.95
RST SIX PKG + 64K w/FREE	
BORLAND SIDEHICK	249.95
64K RAM (9) SET	9.95
256K CHIPS EA	4.95

#### MICROSOFT

FLIGHT SIMULATOR	36.95
JET	34.95
WORD	249.95
DOWNS & SENSE	
w/FORECAST	109.95
CROSSTALK XVI	129.95

#### SIDEWAYS

44.95

★ ★ CALL FOR OTHER PRICES ★ ★  
BECAUSE HARDWARE AND SOFTWARE  
PRICES ARE CHANGING SO RAPIDLY,  
WE URGE YOU TO CALL US FOR OUR  
VERY LOWEST CURRENT PRICES!  
WE APPRECIATE YOUR BUSINESS and will do  
everything we can to make you happy  
TERMS: F.O.B. Westminster, CA. We accept VISA,  
Mastercard, Cash, Money Orders, Checks, Certified  
Checks are better. Purchase Orders (2% 10-Day 1%  
Add 2% for bank cards & P.O.'s. Ask about our return  
policy. Prices are subject to change and hopefully  
will go down. Subject to stock on hand.

10/85

## GARDEN OF EDEN

COMPUTERS

ORDERS ONLY

800-762-3227

OUTSIDE CALIFORNIA ONLY

800-331-0045

INSIDE CALIFORNIA

16485 Magnolia, Westminster, CA 92653

1/2 blk. N. of the 405 Freeway

Mon-Fri 10-6:30 Sat 10-5

CLOSED SUNDAYS & TUESDAYS

CIRCLE 252 ON READER SERVICE CARD

charging battery. The only detail I found to criticize on the card from a technical standpoint is that the clock's battery is soldered in. These batteries have a life of several years, but eventually they do need to be changed. The designers of many multi-function cards now use batteries held in by clips so that the battery can be changed without resoldering.

Mounted on the rear edge of the circuit card are standard PC connectors for parallel printer and RGB color monitor cables. Connections for the serial port and composite video are brought out to standard connectors. These are held on a special bracket that mounts on the back of the PC through the use of the screws that hold the expansion cards in place. This method of mounting eliminates competition for the "pop-out" holes in the back of the PC and allows flexibility. Moreover, having the extension cable and mounting bracket available prevents you from being forced

into using a specific expansion slot.

The Persyst card has a large number of options that are set with jumpers on the card. It comes ready to operate, but if you

Persyst uses its own color display driver and parallel printer controller integrated circuits to reduce the chip count and space requirement on the Color Combo board.

ever want to change the serial port from COM1 to COM2, turn off the clock, or change to the second character set in the video ROM, you can do it with slide on/off jumpers.

As with many modern multifunction cards, the Persyst Color Combo card uses a combination of 64K-bit and 256K-bit memory chips to pack 384K bytes of RAM into three rows of nine chips. Two rows are populated with 64K-bit chips, but the third row can be populated with either 64K-bit or 256K-bit devices, depending on how much added RAM you need. Although the memory addresses can be switched so the Color Combo card can fit in with other RAM expansion devices, the lowest memory address it can occupy is hex 20000.

#### The Memory Gap

This brings us to the one limitation inherent in the Persyst Color Combo card. A PC manufactured before March 1983—with 16K-bit RAM chips on the motherboard—just doesn't have enough memory on its motherboard to meet the lowest starting address (hex 20000) of the Persyst



### Contemporary ComputerWear

DUST COVERS  
FOR  
THE IBM PC



Attire your IBM PC in Style!  
ComputerWear—Beige, 100% cotton  
canvas covers with grey trim and embroidered  
emblem. Order Now! Satisfaction guaranteed.  
Custom logo in quantity.

- ☐ Yes, protect my PC in style! Send me:
- Keyboard ..... \$16
  - Monitor ..... \$18
  - Drive ..... \$18
  - 1 pc Mon/Drive ..... \$36
  - Printer (Epson MX/FX-80 ..... \$18
  - Okidata 82, 92)

- Printer (Epson FX-100, ..... \$20  
NEC P3, Okidata 83, 93)  
Printer (NEC 3550) ..... \$20
- ☐ Visa ☐ MC ☐ Check
- Add \$2.00 Shipping, Total: \_\_\_\_\_  
(California residents add tax)

Print Name \_\_\_\_\_  
Address \_\_\_\_\_  
City/State \_\_\_\_\_ Zip \_\_\_\_\_  
Credit Card # \_\_\_\_\_ Exp \_\_\_\_\_

### Contemporary ComputerWear At: EM

1320-36th Ave. / San Francisco, CA 94122 / (415) 759-1466

IBM is a registered trademark of IBM Corp. Dealer inquiries invited. PC-AT covers available.

CIRCLE 121 ON READER SERVICE CARD

**Precision Data Products**  
Complete Line of Quality  
Supplies for Your Computer

TOLL FREE  
ORDER LINE  
**800-258-0028**

FOR INFORMATION CALL  
**616-452-3457**

#### INTRODUCING

STATE-OF-THE-ART MAGNETIC MEDIA

FROM ONE OF THE LEADING MAGNETIC MANUFACTURERS IN THE WORLD

#### 5 1/4" DISKETTES

- With Hub Rings
- With Write Protect Tabs
- With Static-Free, Dust-Free Envelopes
- With User ID Labels
- In Factory Sealed Poly Packs

#### RIGOROUS QUALITY CHECKS ENSURE THEIR RELIABILITY

**69¢**

Single Side  
Double Density

**79¢**

Double Side  
Double Density

INDIVIDUALLY CERTIFIED 100% ERROR FREE  
COVERED BY A FULL LIFETIME WARRANTY  
MEET OR EXCEED APPLICABLE ANSI & ECMA ISO STANDARDS

READY FOR IMMEDIATE

SHIPMENT — ALL ORDERS

SHIPPED WITHIN 24 HOURS



**Precision Data Products**  
P.O. Box 8367, Grand Rapids, MI 49508  
(616) 452-3457 • Michigan 1-800-258-0028  
Outside Michigan 1-800-258-0028



CGD

CIRCLE 123 ON READER SERVICE CARD

# GRAPHWRITER

THE WORLD'S GREATEST LIBRARY OF  
CHARTS AND GRAPHS.



CIRCLE 377 ON READER SERVICE CARD

## EXPANSION OPTIONS

memory chips. If you have another 64K bytes of RAM tucked away someplace (on a Z-80 CP/M card, for example), you could make up the difference. But if you only have 64K bytes available to start, the Persyst card cannot make up the gap. Perhaps the Persyst engineers felt that all of the PCs from IBM's first 17 months of production already have their video cards and memory installed. No doubt they are right, but if you are reconfiguring an old "Model A" PC (the newer models were stamped with a circled "B"), you have to make up the memory gap if you want to use the Persyst Color Combo.

### Documentation

The manual for the Color Combo card equals IBM's optional *Technical Reference* manual in detail and completeness. If you have never added an expansion card to a PC, the manual will take you through a step-by-step process. It also clearly describes how to set the memory options and install your own memory chips—and, if you are interested in programming the 6845 video controller card, it gives you the technical information you need. In fact, Persyst's technical documentation is very complete. My only complaint is that the company's telephone number does not appear anywhere in the documentation: Calling customer service is evidently not one of your alternatives.

### The Software Selection

The Color Combo card comes with programs that allow you to set and read the clock, install a RAMdisk, and insert a print spooler into RAM. The clock and RAMdisk programs are fairly standard, but the print spooler program has some handy features: It can reroute output from a parallel port to a serial port, pause and resume printing, present printer control alternatives, and control the reprinting of pages.

### Compatibility

Compatibility is particularly important with regard to video devices, because many IBM "work-alike" computers and cards work differently when it comes to painting pictures on the screen. Some add-on hardware has also fallen flat in the communications department because of an inability to do everything the IBM



Communications Adapter cards can.

If PC emulation hardware uses the same chips found in the corresponding IBM equipment, it is likely to be compatible. Persyst uses the same major chip sets as IBM. The peripheral and support chips have been integrated in the Persyst system, but the design follows the IBM pattern.

I loaded and ran every "sensitive"

A PC manufactured before March 1983 just doesn't have enough memory on its motherboard to meet the lowest starting address of the Persyst Color Combo board's memory chips.

piece of software I could find to test Persyst's compatibility. The standard *Flight Simulator* and *1-2-3* tests worked fine, as did other discriminating programs such as *Word Vision*. The RS-232C port worked with every combination of communications software and modems I threw at it, including *Smartcom II*, *Crosstalk XVI*, *Kermit*, *Xmodem*, and *PC-Talk III*. The integrated Persyst Color Combo card ran like the separate IBM pieces would.

## Easy Winners

A constant influx of new products, many designed for specialized needs, is bringing new vitality to today's marketplace. Even if you buy what you consider the ultimate computer, you'll soon find yourself searching for ways to expand its repertoire. And as long as there are empty slots available, who wouldn't be tempted to add a hard disk, mouse, modem, graphics tablet, a speech recognition and/or synthesis board—or even one of the growing number of special products such as an appliance controller, sensor, or a police/fire scanner interface? The ease with which both of these products save you dollars and space brings more of these capabilities within reach. ■

Frank J. Derfler, Jr., is a contributing editor of PC Magazine.

## REACH FOR THE SKY

It's minutes before the big presentation. You're all pumped up. You're ready to go. Nothing can hold you back.

If, that is, you've got Graphwriter and Freelance. Two graphics software packages for your IBM® PC or compatible that put more energy into your presentations than anything else on the market today.

Graphwriter gives you all the charts and graphs you're ever likely to use in a presentation. Everything from bar charts to Gantt charts to organization charts.

They don't just show the facts. They transmit your ideas to your audience with a visual intensity that reaches all the way to the guy in the back row.

Freelance gives you all the rest. It lets you customize your existing Graphwriter, Lotus® 1-2-3® and Symphony® charts for maximum impact.

Increase the size. Drop in text. Pull in arrows, trucks, human figures and a host of other useful symbols. You even get the freedom to create your own logos, diagrams and other original drawings.

Both Graphwriter and Freelance also do a dynamite job on word charts, which many packages leave out.

And best of all, they can work with each other. Individually, they're the most powerful presentation graphics packages available today. Together, they're all the presentation graphics software you'll ever need.

Take your presentations higher. Call today for the full story on Graphwriter and Freelance.

# 617-890-8778



GRAPHIC COMMUNICATIONS, INC.  
230 Fifth Avenue  
Waltham, Massachusetts 02254



# The Service Computer Company

WE  
WELCOME  
CORPORATE  
ACCOUNTS

# RAPIDWARE

CALL FOR OVER 1000 ADDITIONAL ITEMS

**FREE**  
OVERNIGHT  
DELIVERY \*\*

We'll Beat  
Any Price  
By

**\$12\*\***

## Software

	LIST PRICE	OUR PRICE
ASHTON TATE, dBASE II	595	374
BORLAND INTERNATIONAL Sidekick (Protected)	55	34
Sidekick (Non-protected)	85	54
BRODERBUND SOFTWARE Bank Street Writer	80	54
BPI SYSTEM Job Cost Accounting	795	495
Inventory	795	375
General Accounting	595	375
AP, AR, or PR	595	44
Funk Software, Sideways	80	44
Fox & Geller Quickcode II	295	164
Quickcode III	295	164
dGraph II	295	164
dGraph III	295	99
dUnit III	495	274
Harvard, Tol. Prog. Mgr.	350	208
ORCINI/US, Easy Writer	595	308
GL, AR, AP, Inventory	595	308
LIFETIME, VoiceWriter deluxe	295	169
LIVING VIVO, Think Tank	150	99
LOTUS 1-2-3	495	385
LOTUS 1-2-3	595	385
MECA, Managing Your Money	200	124
MICROPRO, Wordstar 2000	495	285
Wordstar 2000+	595	305
MICROIM RBASE 5000	700	369
MICROSOFT, Word	375	239
Multiplan	195	129

	LIST PRICE	OUR PRICE
MICROSTUFF, Crosstalk	195	104
MONOGRAM, Dollar & Sense	180	114
MULTIMATE	495	249
PEACHTREE SOFTWARE	CALL	CALL
PETER HORTON, USARS	100	64
SOFTWARE ARTS, TK Solver	400	254
SOFTWARE GROUP, Enable	895	379
SOFTWARE PUBLISHING	79	79
PFS: Report	125	89
PFS: File, PFS: Plan	140	89
PFS: Graph, PFS: Write	140	64
PFS: Proof	95	64

	LIST PRICE	OUR PRICE
HERCULES, Color	245	189
HERCULES, Graphics	499	309
QUADRAM, Quadboard (256K)	595	359
PARADISE, 5 pack	229	174
TECMAR, Captain Multitrac (64K)	269	209
COMPUTERS IBM, APPLE, COMPAQ, others	CALL	CALL
HARD DISKS MAYNARD, 20 mb int. w/Cont	1400	844
IOmega, TALLORUS, CORVUS, others	CALL	CALL
MONITORS Smartmodem 1200b	489	284
Smartmodem 1200b	549	379
(w/Smartcom II)	599	329
Smartmodem 2400	375	269
PROMETHEUS, Promodem 1200b	495	339
Promodem 1200	230	159
MONITORS AMDEK, 310a (Amber)	349	254
Color 300	CALL	CALL
Precision Graphics, Texas, Quadram, etc.	349	219
PRINTERS PANASONIC, P1090	399	309
P1091	799	629
TOSHIBA, P1340 (144cp)	1900	1379
P351 (288cp)	CALL	CALL
EPSON, OKIDATA, NEC, many others	CALL	CALL

## Hardware

	LIST PRICE	OUR PRICE
ACCESSORIES CH PRODUCTS Mech III w/Fire Button	55	41
KOALA, Touch Tablet	150	104
w/Software	150	104
KENNINGTON, Masterpiece	50	39
PC Saver Line Cord	220	149
w/Filter	CALL	CALL
MOUSE SYSTEMS, PC Mouse & Pad	495	359
MEMORY CHIPS, CABLES, POWER BACKUPS, CLEANING KITS, COVERS, PROTECTORS, FLOPPIES, etc.	595	419
BOARDS AST, Mega Pak (256K)	CALL	CALL
AST, Advantage (128K)	595	419

CALL FOR  
WEEKLY SPECIALS!

AD#  
F12

FREE NATIONAL SALES  
HOT LINE

**1-800-642-7675**

Products listed for IBM PC ONLY. Call for APPLE and other micro systems.  
TERMS: \* Products have full manufacturers warranty \* No surcharge for credit cards  
\* Authorizing purchase orders and C.O.D.'s accepted \* Prices may change.  
\*\* For products over \$100 only. Call for details.

MAIL TO: RAPIDWARE  
6900 E. Indian School  
Scottsdale, AZ 85251  
(602) 947-3806

# A Sight Better Than TREE

DOS's TREE utility gets the job done, but, visually, it leaves something to be desired. That's why VTREE was created.

A well-designed system of tree-structured directories is essential for organizing the multitude of files that accumulate on a hard disk. The PC-DOS manuals for Versions 2.0 and above devote a whole chapter to the subject, illustrating the tree structure visually by showing the various subdirectories as branches.

You'd think that the PC-DOS TREE program would clarify the subdirectory structure by putting a similar display on the screen. If you've ever tried TREE, however, you know that while it provides the information about subdirectory organization, it really flunks out in the visual representation department. It doesn't even make use of the line graphic characters to show the various branches and levels.

There are several possible reasons for

## 1985/No. 22

this nonsense. First, since Microsoft wrote many of the DOS programs for inclusion in generic MS-DOS systems, they could not presuppose IBM's special line graphics characters. Second, the current TREE command lends itself to doing searches with FIND. Third, and most plausible, IBM didn't want PC users to get lazy, so they left us a perfect place to exercise our programming skills by rectifying their omission.

Not to let such an opportunity slip, I've written VTREE—the Visual Tree command—so you can see visually how your subdirectories are organized. The new command is as easy to use as the PC-DOS

```

100 REM -- BASIC PROGRAM TO CREATE VTREE.COM
110 OPEN "VTREE.COM" AS #1 LEN = 1
120 FIELD #1,1 AS A$
130 CHECKSUM = 0
140 FOR I% = 1 TO 64
150   LINESUM% = 0
160   FOR J% = 1 TO 8
170     READ BYTE%
180     CHECKSUM = CHECKSUM + BYTE%
190     LINESUM% = LINESUM% + BYTE%
200     LSET A$ = CHR$(BYTE%)
210     PUT #1
220   NEXT J%
230   READ LINECHECK%

```

(Figure 1 continues)

Figure 1: The BASIC program to create VTREE.COM.

# MAGNUM PC

800-544-4354

ORDERS ONLY

### COMPUTERS

IBM PC, XT OR AT YOU CONFIGURE	SAVE
COMPAQ DESKPRO'S & PORTABLES	CALL
ERICSSON PORTABLE PC	NEW
AT&T 6300-PC	SAVE

### EXPANSION CARDS

AST SIX PAK PLUS (64K & SIDEKICK)	269
ADVANTAGE PREVIEW	399/279
EVEREX GRAPHICS EDGE	219
HERCULES GRAPHICS CARD	329
COLOR CARD	168
IRMA 3278 EMULATOR	799
ORCHID PC BLOSSOM & TURBO	CALL
PARADISE MODULAR GRAPHICS CARD	NEW
PROFIT SYSTEMS MULTIGRAPH	CALL
PERSYST TIME SPECTRUM	269
QUADRAM QUADBOARD (OKI/64K)	225/269
STB ALL PRODUCTS	CALL
TECMAR GRAPHICS MASTER	459

### DISK DRIVES

FULL HEIGHTS (FOR IBM)	FROM 110
HALF HEIGHTS (FOR IBM)	FROM 85
ALLOY PC-STOR/OICSTOR	CALL
AMPEX	CALL
EVEREX EXPANSION CHASIS	775
EXPANSION W/ 10 - 20 MB	FROM 1395
CORE AT 20 - AT 72	FROM 1249
IONEGA BERNOLLI PLUS	2550
KAMERMAN LABS	
MASTERFLIGHT SYSTEM	CALL
KODAK 3.3 MB W/BKUP SOFTWARE	682
PEACHTREE TECHNOLOGIES	FROM 699
TALGRASS HARD DRIVES & TAPE	CALL

### PC-JR ENHANCEMENTS

AST JR COMBO	CALL
RACORE DRIVE 2 ENHANCEMENT	449
10 MB ENHANCEMENT	SAVE
TECMAR JR CAPTAIN	325
JR WAVE JR 2ND MATE	SAVE

### PRINTERS

CANON (FULL YEAR WARRANTY)	CALL
EPSON FX, RX, LX, LD	CALL
OKIDATA ALL MODELS	BEST PRICES
SMITH CORONA 0100/0200/D300	199/239/419
STAR-MICRONICS SG-10/15	243/407
TOSHIBA P351-P1340	1225/579

### MONITORS

AMDEK 310 (IBM PLUG-IN - AMBER)	169
PGS MAX 12E/HX-12	169/469
TAXAN ALL MODELS	CALL

### SOFTWARE

SYMPHONY	475	COPY II PC	35
MULTIMATE	249	0-BASE III	399
SAMNA III	CALL	FRAMEWORK	399
ENABLE	SAVE	LOTUS 1-2-3	399

### MODEMS

HAYES SMART MODEM 300-1200	199/399
1200B/1200	349/379
2400 BAUD MODEM	CALL
TRANSET 1000	CALL

### ACCESSORIES

CHIPS 64K - SET OF 9	10
256K - SET OF 9	59
SWITCH BOXES MANUAL & AUTOMATIC	CALL

### DISKETTES

BASF 5 1/4" SS/D0 (Each-lots of 10)	1.20
5 1/4" OS/D0 (Each-lots of 10)	1.75
5 1/4" OS/H0 IBM-AT (Each-lots of 10)	4.35
MAXELL 5 1/4" OS/D0 (Each-lots of 10)	2.25
VERBATIM 5 1/4" OS/D0 (Each-lots of 10)	2.25

1-800-544-4354

ORDERS ONLY

FOR INFORMATION - (404) 441-3112  
5965 PEACHTREE CORNERS EAST B-2  
NORCROSS, GEORGIA 30071  
AVAILABILITY AND PRICES SUBJECT TO CHANGE  
APPROVED CORPORATE ACCOUNTS WELCOME

CIRCLE 363 ON READER SERVICE CARD

```

240 IF LINECHECK% <> LINESUM% THEN PRINT "Error in Line";299 + I%
250 NEXT I%
260 CLOSE
270 IF CHECKSUM = 51950 THEN PRINT "Successful Completion!" : END
280 PRINT "COM file is not valid!" : END
300 DATA 235, 95, 144, 0, 58, 92, 42, 46, 712
301 DATA 42, 0, 40, 67, 41, 32, 67, 111, 400
302 DATA 112, 121, 114, 105, 103, 104, 116, 32, 807
303 DATA 67, 104, 97, 114, 108, 101, 115, 32, 738
304 DATA 80, 101, 116, 122, 111, 108, 100, 44, 782
305 DATA 32, 49, 57, 56, 53, 73, 110, 118, 548
306 DATA 97, 108, 105, 100, 32, 100, 105, 115, 762
307 DATA 107, 32, 100, 114, 105, 118, 101, 36, 713
308 DATA 82, 101, 113, 117, 105, 114, 101, 115, 848
309 DATA 32, 68, 79, 83, 32, 50, 46, 48, 438
310 DATA 32, 43, 36, 0, 0, 0, 92, 42, 245
311 DATA 46, 42, 0, 6, 1, 60, 3, 0, 158
312 DATA 0, 60, 255, 117, 10, 141, 22, 45, 650
313 DATA 1, 180, 9, 205, 33, 205, 32, 180, 845
314 DATA 48, 205, 33, 60, 2, 115, 6, 141, 610
315 DATA 22, 64, 1, 235, 236, 160, 92, 0, 810
316 DATA 10, 192, 117, 6, 180, 25, 205, 33, 768
317 DATA 254, 192, 138, 208, 4, 64, 162, 3, 1025
318 DATA 1, 252, 139, 22, 93, 1, 180, 26, 714
319 DATA 205, 33, 139, 30, 84, 1, 3, 219, 714
320 DATA 128, 62, 83, 1, 0, 117, 18, 199, 608
321 DATA 135, 252, 2, 0, 0, 186, 3, 1, 579
322 DATA 185, 16, 0, 180, 78, 205, 33, 235, 932
323 DATA 4, 180, 79, 205, 33, 115, 3, 233, 852
324 DATA 222, 0, 139, 54, 93, 1, 128, 124, 761
325 DATA 21, 16, 117, 237, 131, 198, 30, 128, 878
326 DATA 60, 46, 116, 229, 255, 135, 252, 2, 1095
327 DATA 139, 14, 84, 1, 227, 58, 131, 191, 845
328 DATA 252, 2, 1, 116, 33, 43, 219, 176, 842
329 DATA 179, 247, 135, 252, 2, 0, 128, 116, 1059
330 DATA 2, 176, 32, 232, 253, 0, 81, 185, 961
331 DATA 16, 0, 176, 32, 232, 244, 0, 226, 926
332 DATA 249, 89, 67, 67, 226, 225, 131, 191, 1245
333 DATA 252, 2, 1, 117, 11, 139, 14, 95, 631
334 DATA 1, 176, 196, 232, 221, 0, 226, 249, 1301
335 DATA 86, 139, 54, 93, 1, 191, 128, 0, 692
336 DATA 139, 215, 185, 43, 0, 243, 164, 94, 1083
337 DATA 180, 26, 205, 33, 180, 79, 205, 33, 941
338 DATA 114, 20, 128, 62, 149, 0, 16, 117, 606
339 DATA 243, 176, 194, 131, 191, 252, 2, 1, 1190
340 DATA 116, 21, 176, 195, 235, 17, 176, 196, 1132
341 DATA 131, 191, 252, 2, 1, 116, 8, 176, 877
342 DATA 192, 129, 143, 252, 2, 0, 128, 232, 1078
343 DATA 153, 0, 176, 196, 232, 148, 0, 176, 1081

```

(Figure 1 continues)

344 DATA	32,	232,	143,	0,	185,	13,	0,	139,	744
345 DATA	62,	91,	1,	172,	10,	192,	116,	6,	650
346 DATA	170,	232,	127,	0,	226,	245,	176,	32,	1208
347 DATA	232,	120,	0,	137,	14,	95,	1,	137,	736
348 DATA	62,	91,	1,	255,	6,	91,	1,	190,	697
349 DATA	86,	1,	185,	5,	0,	243,	164,	255,	939
350 DATA	6,	84,	1,	198,	6,	83,	1,	0,	379
351 DATA	131,	6,	93,	1,	43,	233,	242,	254,	1003
352 DATA	131,	62,	84,	1,	0,	116,	74,	247,	715
353 DATA	135,	252,	2,	255,	127,	117,	10,	176,	1074
354 DATA	13,	232,	63,	0,	176,	10,	232,	58,	784
355 DATA	0,	191,	3,	1,	185,	70,	0,	176,	626
356 DATA	0,	242,	174,	79,	185,	64,	0,	176,	920
357 DATA	92,	253,	242,	174,	242,	174,	71,	137,	1385
358 DATA	62,	91,	1,	255,	6,	91,	1,	190,	697
359 DATA	86,	1,	185,	5,	0,	252,	243,	164,	936
360 DATA	255,	14,	84,	1,	198,	6,	83,	1,	642
361 DATA	1,	131,	46,	93,	1,	43,	233,	161,	709
362 DATA	254,	205,	32,	82,	138,	208,	180,	2,	1101
363 DATA	205,	33,	90,	195,	0,	0,	0,	0,	523

(Figure 1 ends)

TREE command. It has one optional parameter. The syntax of VTREE is

VTREE [d:]

where *d* is an optional drive specification. VTREE does not support the /F parameter available with the TREE command to list files along with subdirectories. (Inclusion of this feature in VTREE is an exercise left to the more venturesome among our readers.)

VTREE can display up to four directory levels without difficulty, and even a fifth if the directory names on that level do not exceed eight characters. However, deeper levels will wrap around (the display limit is 80 characters, after all) and will therefore be difficult to read.

You can, of course, get a print of the VTREE output by just redirecting to the printer, with the command

VTREE >PRN

However, unless your printer can print the extended character set of the IBM PC, you'll see something else instead of the line characters. (The solution to this, of course, is to use John Dickinson's PRSWAP.COM, which appeared in the Programming column in Volume 4, Number 19—Ed).

#### Getting the Program

The three VTREE files (.ASM, .COM, and .ASC [BASIC]) can be downloaded from the PC Magazine Interactive Reader Service by calling (212) 696-0360 with your modem. Your modem software must use the Xmodem file transfer protocol to download VTREE.COM directly. If you haven't got Xmodem support, you can use regular ASCII to download VTREE.ASC. Rename this VTREE.BAS, run it under BASIC, and it will create VTREE.COM for you.

If you're interested in learning more about assembly language, and you want to follow the discussion below closely, you'll want to download the source code, VTREE.ASM. While I recommend using Xmodem when available, you can download the .ASM in straight ASCII. And, of course, if you haven't got a modem, you can get a copy of VTREE.ASM by sending a self-addressed, stamped envelope to Technical Editor, PC Magazine, One Park Ave., New York, NY 10016.

Once you have VTREE.ASM on your disk, VTREE.COM can be assembled (using any version of the IBM or Microsoft assembler) by running:

MASM VTREE;

LINK VTREE;

EXE2BIN VTREE VTREE.COM

Ignore the "No Stack Segment" message from MASM. It's not really an error, since you're making a .COM, not an .EXE, program.

#### Subdirectory Structure

Before taking a close look at VTREE.ASM, it's well to know something about specifying subdirectories in DOS function calls.

On the DOS command level, a subdirectory is created by the MKDIR (or MD) command. Subdirectory names follow the same rules as file names: they may have an 8-character length, followed by a 3-character extension. The DOS command CHDIR (or CD) is used to change current directories; RMDIR (or RD) is used to remove an empty directory. Subdirectories may be nested. The full directory path consists of a list of the directory names, from the root directory onward, each separated from the next in the sequence by a backslash.

When subdirectory paths are used in DOS function calls, they look much the same as when they are used in the DOS commands CHDIR, MKDIR, and RMDIR. The difference is that they must

# LETTRIX™ Improves PC Printing

With LETTRIX™ your IBM ProPrinter, Epson, Okidata, IBM Graphics, Star Gemini, or Panasonic printer can print proportionally-spaced and microjustified letter-quality text directly from all software.

Before: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdef  
After: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdef

LETTRIX™ resides in your PC's memory between your software and printer, responding automatically to spacing, paging, margins, **boldfacing**, underlining, *italics*, subscripts and superscripts. Just print as you would normally... LETTRIX takes care of the rest!

*"The top of its class."* -- PC PRODUCTS MAGAZINE  
*"A fun program that is easy to use."* -- PC WEEK  
*"The sharpness and clarity nearly equals that of an expensive daisy wheel printer."* -- THE NEW YORK TIMES  
*"Surprisingly low price."* -- BOARDROOM REPORTS

You can design your own characters on any display, or use the twenty different typefaces included: **Broadway**, **Courier**, **Old English**, **Art Deco**, **OUTLINE**, **EEEEEEEE**, **Engraved**, **PAIA ANIMA**, **WESTERN**, **SHADOW**, **Roman**, **BANKER**, **Gothic**, **Prestige**, **Folio**, **ORATOR**, **OCR-A**, and the entire IBM foreign language and line-drawing character set:

$$\sum_{n=1}^{\infty} \frac{(\mu + \beta)}{6.718} \approx \int_1^{\infty} \left[ \frac{\partial^3 u}{\partial t^3} + u \frac{\partial u}{\partial x} \right] + \frac{\Lambda x \cdot \xi}{\sigma \mu / \Omega}$$

Français, Español, Italiano, Deutsch, Русский,  
Ελληνικός, יידיש, עברית, פורטוגזית, עברית, עברית

You can control LETTRIX features either by accessing a menu that pops-up over your current software, or by placing simple single-character commands in your text.

For fastest delivery, charge LETTRIX to your VISA or MasterCard by dialing (800) 351-4500. LETTRIX™ costs just \$98.50. We pay UPS shipping.

Call and mention this magazine for a free print sample. LETTRIX requires an IBM PC, XT, AT, or compatible with 50kb of free memory, and DOS version 2.0 or greater.

This entire advertisement is an actual-size, unretouched column of text printed directly from a wordprocessing program on an EPSON FX printer controlled by LETTRIX™.

HAMMERLAB CORPORATION 5700 ARLINGTON AVENUE  
(203) 776-5699 RIVERDALE, NEW YORK 10471

## PROGRAMMING/UTILITIES

be terminated by a hex 0, so DOS knows where they end. The path listing, with its terminating zero byte, is what the DOS *Technical Reference* manuals call an ASCIIZ string.

The DOS manuals clearly state that an entire subdirectory path may be no longer than 63 bytes, measured from the beginning of the first name to the end of the last name, excluding backslashes in front or at the end.

DOS function call 47h (Get Current Directory) requires a 64-byte area in memory to return the current directory path. It is not preceded by a backslash, but it is terminated by a hex 0 (making it an ASCIIZ string), so this is consistent with the 63-character restriction.

How many nested levels are allowed in a directory structure? Although the manuals never say so, the answer is obviously 32. If each of the subdirectory names is one letter long and they are separated by backslashes, then 32 levels would make the total length 63.

Of course, 32 nested levels of subdirectories would place an enormous drain on DOS as well as on the user's mental faculties. What happens if you attempt to go beyond 32? Well, I once tried to nest 33 one-letter subdirectories under DOS 2.0. DOS did not react with grace under pressure, and I had a tough time undoing what I had done. I've not had the courage to try this under later versions of DOS.

### Finding Files

Although VTREE works mostly with subdirectories, it does not use any of the directory-specific DOS function calls, such as 3Bh (Change Current Directory) or 47h (Get Current Directory). These DOS function calls are really not needed for what we want to do here. We won't be changing subdirectories—we just want to find them.

For the most part, VTREE uses three other DOS function calls: 4Eh (Find First File), 4Fh (Find Next File), and 1Ah (Set Disk Transfer Area). If you want to understand how VTREE operates, it is essential to know how these function calls work together.

The Disk Transfer Area (DTA) was much more important in PC-DOS 1.1 than in DOS 2.0 (and above). Whenever a file

**"We will match  
any mail order  
price in this  
issue."**

William F. Gollan  
President, BCP

read or write took place using the DOS 1.1 function calls (2Eh and below), the DTA was the area in memory that either held the data to be written to the disk or that received the data read from the disk. A program sets a DTA by loading DS and DX with the address and calling DOS with AH set to 1Ah. PC-DOS simply saves this address and then uses it on subsequent file-read and write-file function calls. Only one DTA may be saved by DOS at any time.

I once tried to nest 33 subdirectories under DOS 2.0. DOS did not react with grace under pressure. I've not had the courage to try this under later versions.

The additional DOS 2.0 (and above) function calls, namely numbers 2Fh and above, don't use the DTA for file reading and writing. The area of memory to be written or read is addressed by DS:DX when the function call takes place. Thus, the DTA is no longer needed when the extended file read and write function calls are used.

The exception—there is always an exception!—is for function calls 4Eh (Find First File) and 4Fh (Find Next File). To search for a particular file (or subdirectory), the DTA must first be set to a 43-byte area in memory. Then, DS:DX is set to an ASCII string containing the drive, path, and filename to be found, where *filename* would be \*. \* if all files are to be searched. CX is an attribute for this search. The attribute for a subdirectory is 10h. (When the attribute is set to 10h, DOS will actually find all subdirectories and all regular files.) Then AH is set to 4Eh, and DOS is called with an INT 21h instruction.

On return, the first 21 bytes of the DTA contain information DOS will need for subsequent file finds. This area should not be changed by the program making the call. The reserved area is followed by a 1-byte attribute of the file, a 2-byte file time, a 2-byte file date, a 4-byte file size, and a 13-byte file name. (You'll notice that this is the same information displayed in a DIR

We'll support, service and warranty everything we sell and stand behind it 100%. We won't charge you for shipping or handling, nor will we penalize you for using a credit card.



## MODEMS

D.C. Pages	Pro 1200B white	250
Smartmodem 1200	364 95	<b>Rascal-Paddy</b>
Smartmodem 1200B white	354 95	Manuel 1200 white
Smartmodem 2400	554 95	Manuel 1200B white
Trans 1000 w/128K	299 95	Manuel 2400
<b>Prometheus</b>		Manuel 2400B white

## PERIPHERAL CARDS & ACCESSORIES

ASUS		Peripherals	
Advantage 128T	289.95	5-Pac w/54i	195.
Advantage 128T	289.95	5-Pac w/54i	195.
6-Pac w/ST w/54i	319.95	Mult. Display	399
6-Pac w/ST w/54i	319.95	Mult. Display	399
<b>Curtis Mfg.</b>		<b>Paragon Combo's</b>	
Diamond	34.95	Mon. w/54i	279.
Emerald	39.95	Col. w/54i	279.
Ruby	34.95		
PC. Personal	58.95	<b>Quadrum</b>	
Standard	59.95	AT Quadrum w/128i	444.
Univ. Use	54.95	640 x 480	254
Command Kit	114.95	Multiplayer w/54i	195.
Basic	114.95	<b>Quadrum's</b>	
		New Exp. w/54i	349.
<b>Dynix</b>	22.99	New Exp. w/54i	349.
Storm 25/50D	16.95	Gold w/54i	379.
Storm 25/50D	16.95	Gold w/54i	409.
Storm 25/50D	19.95	Gold w/54i	274
Musical MD 1 25/50	28.95	Silver w/54i	299.

## BUSINESS SOFTWARE

Software		Price	Manufacturer	Price
glaser III		\$71.95	Copper	\$29.95
Framework		37.95		Punchbros
Starcom K6	Computers	27.95	ATI	329.95
Substation		44.95	ATI	329.95
Audio 2.1	Consumers	88.00	PCI	219.95
How Jones		49.95	Real World	369.95
Market Anal.		199.95	GL	389.95
Market Mng.		199.95	GL	389.95
Source Log.		149.95	GL	389.95
CPA +	GMP	369.95	Sales Analysts	
Harvard Project	Navaid	164.88	Enable	Software Group
Harvard Total		264.88	PS/2	Software Publishing
Comshare	Infocom	289.95	PS/2	79.95
Comshare	Lotus	289.95	PS/2	79.95
1.2		23.95	ShareCalc	1.2
Mg Your \$	Ateca	23.95	ShareCalc	2.1
R Base 3000	Microlynx	134.95	RT/AR	294.95
R Base 3000		134.95	RT/AR	294.95
Chart		119.95	RT/AR	294.95
Mutopian	Microsoft	119.95	RT/AR	294.95
			Trigger	267.95
			Unreal	100.95
			Unreal	100.95

## UTILITY & LANGUAGE SOFTWARE

[illegible]

## PRINTERS

Citizen MSP 10	274.95	Garmin SR 15	509.95
Citizen MSP 15	374.95	NEC P22-3	819.95
Citizen MSP 20	344.95	NEC P5	1049.95
Citizen MSP 25	464.95	NEC 2090	629.95
Epson LX 80 FIT	279.95	NEC 3550	1099.95
Epson FX 85	369.95	NEC 8850	1419.95
Epson FX 165	499.95	Okidata 162	364.95
Epson LQ 7500	829.95	Okidata 163	504.95
Epson SQ 2000 Ink Jet	1579.95	Okidata 64	459.95
Garmin SR 10	279.95	Seikosha P1340	569.95
Garmin SR 15	499.95	Toshiba P201	1099.95

**WORD PROCESSING**  
**SOFTWARE**

Broadband		Satellite Software	
Bank 50 Meter	49.95	Wonderpet 4.0	234.95
<b>Living Webcam</b>		<b>Sierra On Line</b>	
Think Tank	99.95	Homestead	44.95
		Homestead Speller	34.95
<b>Micropro</b>		<b>Software Publishing</b>	
Easy	94.95	PI3 World	64.95
WonderPro Pro	24.95	PI3 Word	64.95
Wonder 2000	254.95		
Wonder 2000 +	<b>294.95</b>	Proctor/PI3	
<b>Microsoft</b>		<b>Easyenter II</b>	
Word	229.95	Easyenter II Sys	209.95
<b>Multimate Int'l.</b>			
Multimate 3.3	299.95		

**GAME & EDUCATIONAL  
SOFTWARE**

SOFTWARE			
<b>Davidson Assoc.</b>		<b>Spillme Ace</b>	24 95
Math Reader	34 95	F 15 Fight	24 95
Speed Reader I	45 95	Solo Flight	24 95
Spell II	34 95		
Word Attack	34 95	<b>Microsoft</b>	
		<b>Flight Simulator</b>	34 95
<b>Hayden</b>		<b>Cambridge</b>	
Holy Grail	34 95	<b>MasterType</b>	27 95
Sergeant II	34 95	Run for It	27 95
<b>Human Edge</b>		<b>Boxer Dst</b>	49 95
Mind Probe	34 95	Songster	27 95
<b>Micropress</b>		Nat Worth	59 95
Helix Ace	24 95		



**BUSINESS COMPUTERS**  
OF PETERBOROUGH  
Gordon C. Co. Inc.










## Coup D'etat

AT&T Computers are taking over the P.C. world.

That's because AT&T makes multi-user, multi-tasking micro computers that are 2 to 3 times faster with greater memory capacity than comparable IBM machines.

At Computer Integration Associates we make AT&T Machines even better. We're AT&T's Largest VAR. We sell all AT&T machines, the PC 6300, Unix PC and 3B series of micro computers and all AT&T compatible hardware and software. • Add-On Mass Storage Systems • Tape Backup Systems • Networks-Including

Starlan • Application Software Including Communication Software • Custom Vertical Software • And Much More. We can set up complete office systems, upgrade your present system, and also design software to your specific needs.

Rely on us for expert technical advice, consistent availability and low prices on all AT&T machines and compatibles.

**CIA** Computer  
Integration  
Associates

725 Airport Road, Lakewood, NJ 08701  
(201) 370-3900

CIRCLE 120 ON READER SERVICE CARD

# RETAILERS TAKE NOTE

Create an educated and aware customer with *PC!* Every issue brings your customer new ways of using their microcomputer PLUS it's a "silent salesperson," helping users select new peripherals, software and hardware. If you're interested in a low ticket item that's efficient, effective and profitable, call us today! CALL 212-503-5380!



Or write: Ziff-Davis Publishing Company  
Retail Sales Department  
One Park Avenue—4th Floor  
New York, NY 10016

## PROGRAMMING/UTILITIES

command.) The carry flag is set, and an error code is returned if the drive or path was not valid (this won't be the case in VTREE) or if no more files could be found.

To find subsequent files, all that needs be done is to load 4Fh into AH and call DOS again. This is the Find Next File function call. The DTA will be filled out, just as in a Find First File call. The DOS 3.0 *Technical Reference* manual is wrong in the function call 4Fh documentation when it says that "DS:DX contains the information from a previous Find First call (4Eh)." What it should have said is that the DTA must contain this information. This will be the case if you haven't changed the DTA contents or set it to some other area (and not set it back) following the Find First call.

It is essential to realize that all the information needed by DOS for Find Next calls is in that DTA. So, with proper programming care, we can change the DTA during one search, begin another search, and then change it back to continue the first search. In fact, we can do this as often as we like.

This is exactly what VTREE will be doing. Depending upon the extent of subdirectory nesting, VTREE will deal with up to 33 separate active DTAs (32 levels plus an extra for look-ahead) to search for subdirectories. Of course, we'll handle these DTAs in such a methodical manner that we won't be concerned that there can be so many of them.

### Going to the Source

If you've obtained a copy of VTREE.ASM through the mail or the PC-IRS, you'll be able to follow along and see how VTREE uses all this information to display your subdirectory structure visually in a tree organization.

VTREE begins with some basic housekeeping to determine if the DOS version is 2.0 or above and if the optional drive specification is valid. If no drive specification was specified on the command line, the default drive must be obtained by calling DOS.

The 32 Disk Transfer Areas begin at the end of the program and will expand upward through memory. The first DTA, right after the program, will be used for searching through the root directory. The

next one—43 bytes higher in memory—will be used for searching the first-level directories. This will probably be reused for each subdirectory listed in the root. Each subsequent level uses one DTA higher in memory. The variable "LevelIn" is used to keep track of the nested level currently being searched. The variable "Dta-Pointer" keeps track of the address of the current DTA. The "SearchAscii" string is used for all file searches. We begin by

The DOS information for Find Next calls is in the DTA. We can change the DTA during one search, begin another, and then change it back to continue the first.

searching the path \\*.\*, which means all files on the root directory.

The first time a search is done in a particular directory, the Find First function call 4Eh is used. CX must be set to the attribute we're searching for—in this case 10h, for a subdirectory. However, the Find calls will find both directories and regular files, so we also have to check the attribute of the found file to see if it's a directory. If not, then the search continues with the Find Next function call 4Fh. We will also ignore the "." and ".." directory entries. These are for DOS's own use in finding its way through the maze of trees you may have created on your disk.

When a directory is found, VTRUE prints it on the display and the name is appended to "SearchAscii." When it is printed on the display, it must be preceded by certain line graphics characters to represent the tree structure visually.

Here's where it gets a little tricky. In order to decide which type of line character we need to precede the name of the subdirectory, we must know if there are any further subdirectories to be found. For instance, if the subdirectory we've just found is the first and only one, then a simple horizontal bar (ASCII code 196) will do. If it is the first one, but there are more, then we must have a horizontal bar with a vertical bar sticking from the bottom

## Most project managers want just 3 little things from their software:

### Control, control, control.

If you're a project manager, we know what you face every day.

We're project managers too. And we created our Project Planner software to provide comprehensive support for managers who run all kinds of projects... in engineered construction, aerospace, defense, new product development, data processing, plant maintenance and more.

PRIMAVERA Project Planner™ and Primavision™ Plotter graphics give you sophisticated scheduling capabilities for up to 10,000 activities, resource leveling, cost control, custom reporting, bar charts—the works.

#### PRIMAVERA PROJECT PLANNER

It's the most project management you can get from a micro.

System Requirements: IBM-PC/XT, PC/AT (512k) or compatibles.



**PRIMAVERA SYSTEMS, INC.** Suite 925 • Two Bala Plaza  
Bala Cynwyd, PA 19004 • (215) 667-8600 • TELEX 910 997 0484

I'm interested ☐ Send working demo (\$75.00).  
☐ Send free brochure. ☐ Call me.

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

PC

# DON'T BELIEVE US!

Listen to what actual users are saying about **new Pop-Up™ DeskSet™ and DeskSet Plus!**

"Much better than competition. (Know anyone who wants to buy a Sidekick? \$25) — *Ann Myers, Cummins Engine Co.*

"This is an excellent package. (Thanks!) — *James Bonduant, ComputerLand Corporate*

#### THE CRITICS AGREE:

"Bellsoft has taken the Sidekick idea a step further." *InfoWorld, 1/14/85, "Product of the Year"*

New Pop-Up DeskSet includes Standard and Financial Calculators, Pop-Up Anything, PopUpOS, Pop-Up Word, Calendar, Alarm Clock and Pop-Up Voice. **\$69.95.**

New Pop-Up DeskSet Plus includes all the above plus Pop-Up TeleComm, a telecommunications software program. **\$129.95.**

But don't believe us, see for yourself! You'll find DeskSet and DeskSet Plus at leading software dealers, or for a limited time you may order direct from Popular Programs. Call toll-free and charge your Visa, MasterCard or American Express. **1-800-44-POP-UP (1-800-447-6787)**



**POPULAR PROGRAMS, INC.**

formerly Bellesoft, Inc.

2620 Northrup Way, Bellevue, WA 98004  
(206) 828-7282

\*System requirements: IBM PC, XT, AT, or compatible. Telecommunications require a PC or XT and a Hayes compatible modem. Pop-Up Plus requires an add-on card for Pop-Up Voice. Sidekick is a trademark of Borland International.

CIRCLE 112 ON READER SERVICE CARD

## PROBLEM: WP and PC INCOMPATIBILITY SOLUTION: LINKAGE and SOFTWARE BRIDGE

**DEC, IBM, XEROX, WANG, LEXITRON, PHILIPS/MICOM, VYDEC, LANIER, HBI, CPT, IBM PCs, MULTIMATE, DISPLAYWRITE III, WORDSTAR or SAMMA WORD—ALL NOW COMPATIBLE!**

Switching from an old WP to a new one? Need to transfer information between your PCs and your WPs? Want to send documents from your WP in one city or department to another type of WP or PC in another city or department?

**Linkage**—Connect your dedicated Word Processors to your IBM PCs or PC compatibles running Wordstar, Samma Word, Displaywrite III or MultiMate word processing packages. Communicate, convert, transfer and edit in either direction.

**Software Bridge**—bridge the PC incompatible word processing document gap by performing completely editable conversions of documents between the formats of all the most popular IBM PC and compatibles word processing programs: Displaywrite III, Samma Word, Wordstar Multimate, WordMARC and WordPerfect documents can be converted by **Software Bridge** right on your PC. No other equipment is necessary!

#### WP functions supported by Linkage and Software Bridge

Decimal Tabs	Multiple Document Trans	Overstrike	Merge Codes
Regular Tabs	Hard Carriage Returns	Line Spacing	Required Hyphen
Bottoming	Superscripts/Subscripts	Indenting	Required Page Ends
Titles	Print On and Off	Centering	Right and Left Margins
Stop Codes	Soft Carriage Returns	Underline	Headers and Footers

The **SCC Media Conversion Bureau** provides in-house conversions of documents between any of the machines listed above and more. For more information or our free catalog call:

#### SYSTEMS COMPATIBILITY CORPORATION

410 N. Michigan Ave., Chicago, IL 60611 (312) 329-0700

CIRCLE 222 ON READER SERVICE CARD

## PROGRAMMING/UTILITIES

(194). If it is the last one, then a lower-left corner character (192) is needed. Otherwise, a vertical bar with a horizontal line sticking out to the right (195) is used.

Therefore, before the name of the current directory is printed, our program must look ahead to see if there are additional subdirectories in the current directory. But if we just do this with another Find Next call, then the next time we try to find a subdirectory, we will have already skipped over that one.

Here again, the flexible nature of the DTA comes into play. VTREE copies the DTA currently used for the find calls to the area in memory at 80h. The DTA is then set to the new area to look ahead and test for the presence of any further subdirectories. When we have the information we need, we can reset the DTA to the normal area (unchanged by this look-ahead) for regular processing.

The directory name is printed to the display at the same time it is appended onto the search string. Thus, the display follows what the program is actually doing very closely. Whenever a directory is found, VTREE starts searching that directory. This means it goes in one additional nested level, setting the DTA to another area in memory (incrementing by 43 bytes) and uses the new path for directory searches starting from the beginning.

When no more files are found in the current path, the program has to back up one directory. This is done by stripping the last subdirectory name from the search string and decrementing the DTA by 43 bytes. When VTREE backs up one level, it is thus continuing a search in the previous directory instead of starting over.

When no more files are found and "LevelsIn" is zero, it means we're back in the root directory and have reached the end. At that point the program is simply terminated with an INT 20h instruction.

### One Picture Is Worth 133 Lines

After you've run VTREE once, try running TREE. It'll probably be the last time you ever use the DOS command. I've still got it on my system, but if I ever need an additional 1,500 bytes of storage . . . ■

*Charles Petzold edits the PC Tutor column for PC Magazine.*

# Spreadsheet Clinic

This forum lets readers exchange the ingenious solutions and timesaving hints that make their spreadsheets and integrated software packages work better.

## A Configuration to Suit Every User

When several people use 1-2-3 on the same hard disk PC, they may want to set the program defaults to different values. In my office people solved this problem by making copies of the entire 1-2-3 program to their own subdirectories. This wastes disk space. Since the default configuration values are stored in a 256-byte file called 123.CNF, the solution is to make multiple copies of the configuration file, not of the much larger program files. I therefore wrote a set of individualized batch files that allow everyone who uses 1-2-3 on the same machine to install his own specific 123.CNF file when he first runs the program.

Our hard disk is set up so that 1-2-3 is in a directory called \LOTUS, and the files for each user are in subdirectories. Jane's data, for example, would be in \LOTUS\JANE.

First, I entered the \Lotus directory and made a backup of the 1-2-3 configuration file with the DOS command

```
COPY 123.cnf 123.bak
```

Then I wrote the following DOS batch file, naming it JANE123.BAT:

```
COPY C:\LOTUS\JANE\123.CNF C:\LOTUS
CD \LOTUS
123
COPY 123.BAK 123.CNF
CD \
```

This file copies Jane's configuration file from her subdirectory to the Lotus directory and starts 1-2-3. When Jane exits from 1-2-3, the file automatically copies the standard 1-2-3 configuration file, which I had saved as 123.BAK, back to 123.CNF. In this way other users, each with his own .BAT file, can run 1-2-3 with the standard configuration.

Gary Fuchikami  
Kahului, Hawaii

*This is a good solution to the problem, but I would do several things differently. I would name the different .CNF files JANE.CNF, FRED.CNF, SUSAN.CNF, and so forth, and put them all in the \LOTUS directory. Then I would write a DOS batch file with one replaceable parameter, as follows (see DOS manual section on batch commands for details):*

```
cd \lotus
copy %1.cnf 123.cnf
123
copy 123.bak 123.cnf
```

*I would name the file SETUP.BAT. This way, at the DOS prompt Jane need type only SETUP JANE <enter>, Fred need type only SETUP FRED <enter>, and you get by with just one batch file instead of several. Also, SETUP.BAT works just as well on a floppy-based system as on a hard disk.*

## Entering Zip Codes

Entering Zip codes can be a problem in 1-2-3, especially when they begin with 0; 1-2-3 doesn't allow a numeric entry to begin with a 0 and strips it from the front of the number. I have written a little macro that makes things easier:

```
\$ '[?]{down}/xg\$"
```

The macro automatically assigns a label prefix to your cell entry, waits for the entry, moves to the next cell and then repeats itself. This way your Zip codes can begin with 0. You get out of the endless loop with Ctrl-Break.

Jack Oberkircher  
N. Tonawanda, New York

*Your Zip codes have now become labels instead of numbers, but that should make no difference. You can still use the !Data Sort command to sort them, and I've never*

*heard of anyone doing arithmetic with Zip codes.*

Also, this macro is handy for more things than Zip codes. You can use it any time you want to enter numbers or math symbols as labels. It would be useful for writing macros, for example, where it's easy to forget that you have to precede every ! at the beginning of a line with a label prefix.

You can modify this macro for row work by replacing {down} with {right}. Finally, you might find it useful to replace the initial " with " or " if you want to center or right-justify your labels.

## Debugging a Spreadsheet

In Spreadsheet Clinic of July 23 (PC Magazine, Volume 4 Number 15), a reader pointed out that when you are debugging a spreadsheet, it is sometimes more useful to display formulas on the screen than to display values. That's a good idea, but you can take it further, at least with SuperCalc and with 1-2-3.

Break the screen up into two windows. In one, display formulas, and in the other, display values. Then, as you adjust the formulas in one window, you will immediately be able to see their effect on the values in the other.

Bernard Duskin  
Phoenix, Arizona

*A smart, simple idea. Keep 'em coming.*

## Printer Setup Files

I was very much taken with the suggestion made by Jeffrey Katz in Spreadsheet Clinic of your August 6 issue (PC Magazine, Volume 4 Number 16). (Mr. Katz explained how he keeps track of 1-2-3 setup strings for different printers by building a separate "shell" worksheet for each. These worksheets contain no data—only a

	C	D	E
3	\P	/xlEnter name of Setup File	~FILE Prompt for name of file
4		/rncHERE" {bs}~	Set current cursor position
5		{goto}SETUP"/fcce	Copy file to SETUP
6	FILE		Left open for file name
7		~{goto}HERE"	Cursor return
8		/ppca	Clear print settings
9		rPRANGE"	Establish print range
10		os	Select setup option
11	SETUP		Left open for setup string
12		~qgg	Print and quit

Figure 1: A macro that calls a printer setup string from another file, initializes the printer, and prints the current worksheet.

printer setting that includes the right setup string. To print a worksheet on a particular printer, he first merges it into that printer's shell and then gives the Print command. The same method works for different setup strings used with the same printer.—Ed.) If you use the Katz method, however, you have to save a worksheet and then combine it with the setup string worksheet before you print. While this may not actually take very long, it can seem like an eternity as you sit and watch the Wait indicator.

You can use Mr. Katz's idea and also avoid most of the wait if you merge a small setup string worksheet into a large worksheet rather than vice versa. First, make a small worksheet for each printer or font style and give it an easily remembered name. Each worksheet must contain the setup string as a label in cell 1A, rather than as part of the printer settings. The rest of each worksheet should be blank.

The macro shown in Figure 1 should be in the file you want to print. Give the range names in column C to the cells to their right in column D. Define PRANGE as the part of the spreadsheet you want to print. When you run the macro, it will prompt you for the name of the printer setup file you want to use. Enter the filename and its entire contents will appear in cell D11. The worksheet will then print.

If you want to print the same worksheet on a different printer or in a different style, just run the macro again and enter a different filename at the prompt. You won't have to wait for a lengthy /File Save and /File Combine.

On an entirely different matter, in re-

sponse to George Hagen's submission to the Spreadsheet Clinic of July 23 (*PC Magazine*, Volume 4 Number 15), you comment that /XM macro menus can offer no more than eight choices. That is true. However, for the last option in one menu you can offer the user another menu. To let the user scroll through all his choices more freely, you can even make the last item in the last menu point back to the first menu, and the first item in the first menu point to the last menu.

Richard Pupko  
Orlando, Florida

Right on both counts.

#### Adding the Tab Function to 1-2-3 Macros

The 1-2-3 macro language is a useful programming tool, but for some reason it doesn't include a tab function that would shift the worksheet window one page to the right. Thanks to Judith Epstein's tip on embedding printer codes (*PC Magazine*, Volume 4 Number 13), I have discovered a way to include the Tab key in a macro. The trick is to use ASCII symbol 14.

Like Ms. Epstein, I have written a small BASIC program (see Figure 2) that writes this character and several others to a disk file called C.PRN. If you read this file into your worksheet with the /File Import Numbers command, those characters will be available for use in macros. As you can see from the listing of the BASIC program, many of the ASCII symbols are synonyms for other macro commands.

Joseph Fusco  
San Francisco, California

I have often wondered why there was no tab command in 1-2-3's macro language. Now you can at least use that function. Which of our clever readers will figure out how to include a Shift-Tab in a macro to move the window to the left?

Those who run Mr. Fusco's BASIC program will find that the ASCII symbol equivalents for other macro commands are such things as smiling faces and musical notes. There's nothing to stop your using those in your macros if you feel like it. But imagine the shock that any other 1-2-3 user would experience trying to figure out your macros!

```

10 UPS=CHR$(1)
20 DOWNS=CHR$(2)
30 LEFTS=CHR$(3)
40 RIGHTS=CHR$(4)
50 CENDS=CHR$(6)
60 CGOTOS=CHR$(8)
70 GRAPHS=CHR$(14)
80 HOME=CHR$(16)
90 CALCS=CHR$(17)
100 TABS=CHR$(19)
110 PAGEUPS=CHR$(21)
120 PAGEDOWNS=CHR$(22)
130 CEDITS=CHR$(23)
140 OPEN"C.PRN" FOR OUTPUT AS #1
150 WRITE #1,UPS
160 WRITE #1,DOWNS
170 WRITE #1,LEFTS
180 WRITE #1,RIGHTS
190 WRITE #1,CENDS
200 WRITE #1,CGOTOS
210 WRITE #1,GRAPHS
220 WRITE #1,HOMES
230 WRITE #1,CALCS
240 WRITE #1,TABS
250 WRITE #1,PAGEUPS
260 WRITE #1,PAGEDOWNS
270 WRITE #1,CEDITS
280 CLOSE
290 END

```

Figure 2: This BASIC program creates ASCII symbols for 1-2-3 macro commands, including the tab command.

# A DEFINITIVE ENCYCLOPEDIA IS YOURS!

FOR LESS  
THAN **92¢**  
A VOLUME!



**A**DD-ONS AND ADAPTORS  
**B**USINESS APPLICATIONS  
**C**OMPARISON CHARTS  
**D**ATABASE DEVELOPMENTS  
**E**XPANSION CHARTS  
**F**INANCIAL PLANNING  
**G**RAPHICS INNOVATIONS  
**H**ARDWARE REVIEWS  
**I**NTEGRATED SOFTWARE  
**J**OB/BATCH FILES  
**K**EYBOARD OVERLAYS/TEMPLATES  
**L**OCAL AREA NETWORKS  
**M**OUSE INTERFACES  
**N**ORTON CHRONICLES  
**O**PERATING SYSTEMS  
**P**RISE WATERHOUSE REPORT  
**Q**UALITY CONTROL PROGRAMS  
**R**ECREATIONAL SOFTWARE  
**S**UPPORT SERVICES  
**T**UTORIALS FOR EXPANSION  
**U**SER-TO-USER TIPS  
**V**IDEO INTERFACES  
**W**ORD PROCESSOR EVALUATIONS  
**X**T, AT, AND COMPATIBLE PCs  
**Y**ou can CALL TOLL FREE

1-800-852-5200 to subscribe

to *PC Magazine*, a

**Z**iff-Davis publication.

# AUTHORITATIVE



YES! I need a ready-reference to help me meet my professional PC needs. Please accept my one year subscription to *PC Magazine*—24 bi-weekly issues for only \$21.97! I save 32% off the regular subscription price!

☐ Payment enclosed ☐ Bill me later

Mr./Mrs./Ms. \_\_\_\_\_ (please print full name) Title \_\_\_\_\_ PC 45A5

Company \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Add \$17 additional postage outside the U.S. Please allow 30 to 60 days for delivery of first issue.

# INFORMATIVE



YES! I need a ready-reference to help me meet my professional PC needs. Please accept my one year subscription to *PC Magazine*—24 bi-weekly issues for only \$21.97! I save 32% off the regular subscription price!

☐ Payment enclosed ☐ Bill me later

Mr./Mrs./Ms. \_\_\_\_\_ (please print full name) Title \_\_\_\_\_ PC 45A5

Company \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Add \$17 additional postage outside the U.S. Please allow 30 to 60 days for delivery of first issue.

# UP-TO-DATE



YES! I need a ready-reference to help me meet my professional PC needs. Please accept my one year subscription to *PC Magazine*—24 bi-weekly issues for only \$21.97! I save 32% off the regular subscription price!

☐ Payment enclosed ☐ Bill me later

Mr./Mrs./Ms. \_\_\_\_\_ (please print full name) Title \_\_\_\_\_ PC 45A5

Company \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Add \$17 additional postage outside the U.S. Please allow 30 to 60 days for delivery of first issue.



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

# BUSINESS REPLY CARD

First Class Permit No. 66 Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443  
Boulder, Colorado 80321



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

# BUSINESS REPLY CARD

First Class Permit No. 66 Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443  
Boulder, Colorado 80321



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

# BUSINESS REPLY CARD

First Class Permit No. 66 Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443  
Boulder, Colorado 80321



# YOUR PC ENCYCLO- PEDIA!



## PC Magazine—

The ultimate source of business and professional IBM PC applications—a virtual encyclopedia of information for PC users! The unbiased reviews, proven applications, and analytical evaluations in *PC Magazine* bring you the most comprehensive and accurate coverage available—every two weeks! Make sure you have a complete reference on-hand to help you meet your professional PC needs.

Subscribe to *PC Magazine* today!



### Using a Macro to Save a Worksheet

When you write a 1-2-3 macro that saves a worksheet, you may not always know whether there is a file of that name already on disk. If there is, the program will not immediately make the save. Instead, it will give you a menu choice: Cancel the save operation or Replace the file on disk. With most macros you're likely to want to replace any existing file. However, if you include an *r* as a part of the macro itself and the *r* isn't needed, it can cause an error in the next step of the macro. On the other hand, if you leave out the *r* and happen to need it, the macro processor will read the next line of the macro instead of the *r*, and you will get a different error.

The macro presented in Figure 3 solves this problem. When the *r* is needed, it's used, and the {esc} in line 7 does no harm at all to the worksheet. When the *r* isn't needed, the {esc} cancels it before it can do

	B	C	D
3	\P	/xlEnter the name of the file: "c5"	
4		/fs	
5		-	
6		r{esc}	
7		(macro . . .	
8		. . . continues)	
9			
10			
11			
12			

Figure 3: A macro that saves a file whether or not one with that name already exists on the disk.

any irreparable damage.

Marion Markle  
Salt Lake City, Utah

*This nifty little trick will work just as well if you don't want the macro to overwrite a file of the same name that is already on disk. All you have to do is to change the letter r in line 7 to c.*

### Contribute to the Clinic

Share your latest spreadsheet discovery through PC's Spreadsheet Clinic. We'll pay you \$50 for anything we print, *plus an extra \$25 if you submit it on a disk*. If you send a disk, please include a printout.

Mail your contributions to Spreadsheet Clinic, PC Magazine, One Park Avenue, New York, NY 10016. ■

# Can your editor work with 16,000,000 bytes of memory? SPF/PC™ 1.8 from CTC can!

The best full screen editor for the IBM PC is now even better than ever.  
It looks and works like IBM's large system SPF editor, but SPF/PC  
executes faster and handles larger files than its mainframe cousin.

#### AT EXTENDED MEMORY

SPF/PC can use up to 15,850 KB of memory.

#### TOP VIEW COMPATIBLE

SPF/PC supports windowing and background execution.

#### COMMUNICATIONS FEATURE

Easy to use communications software.

**\$195**

UPGRADES only \$50  
(\$10 if communications upgrade)

Add \$5 for shipping  
Canada \$10 Foreign \$15



Check or purchase order  
accepted

#### FAMILY TIES

- SPF/PC is used by IBM to demonstrate the IBM 3270/PC to its corporate clients
- SPF/PC provides the same outstanding performance on any PC, from JR to AT
- SPF/PC works with DOS 1.00-3.00 and any IBM PC or true compatible with 192K

IBM is a registered trademark of International Business Machines, Inc. SPF/PC is a registered trademark of Command Technology Corporation.

TO ORDER  
SPF/PC...

Contact: Command Technology Corporation  
1900 Mountain Boulevard  
Oakland, CA 94611.

(415) 339-3530  
Telex: 509330

CIRCLE 182 ON READER SERVICE CARD

## FREE TYPESETTING

This advertisement was printed on a Brother HR-15 daisy wheel printer using the Personal Typesetting program. Can you tell the difference between the type in this advertisement and the type printed by a expensive typesetting machine? Only a typesetter would notice the difference.

## SAVE MONEY

Why pay a typesetter ten to twenty dollars a page to typeset your manuals, books, instructions and other documents? With the Personal Typesetter you can have your documents typeset for free.

## SAVE TIME

When you go to a typesetter how many days or weeks do you wait to get your copy back? How much time do you spend proof reading the copy? How many days do you wait for your typesetter to make corrections? You could have your copy typeset by the Personal Typesetter in just a few minutes. There is no rekeying the copy so no typos can creep in.

## IMPROVE YOUR IMAGE

Due to the high cost and time involved in conventional typesetting you may not have all your documents typeset. Documents that are not typeset look cheap and amateurish. With the Personal Typesetter all your documents can be typeset for free in just a few minutes. Typeset copy looks good and is easy to read.

## REDUCE PRINTING COSTS

Typeset copy uses 30% to 50% less paper than typed copy because the letters are closer together. The Personal Typesetter can save you hundreds or thousands of dollars in printing and copying costs.

The Personal Typesetter requires an IBM PC or compatible with 192K, WordStar (not WordStar 2000) and a letter quality printer that moves in 1/120 inch horizontal and 1/48 inch vertical increments (almost all letter quality printers). If you prefer to use a different word processor that has ASCII output you can have your secretary type in the WordStar control codes using WordStar.

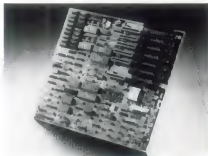
I am tired of spending my money on typesetting. I want to be able to do my own typesetting for free. Enclosed is a check for \$69. Rush me a copy of the Personal Typesetting program.

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_  
State Zip \_\_\_\_\_

Potomac Pacific Engineering Inc.  
Box 2027 Gaithersburg, Maryland 20879  
(301) 977-1489

Personal Typesetting is a Trademark of P.P.E.

# NO WHERE BUT HERE!



- PC & AT MOTHER BOARDS
- 5 MHz PC SYSTEM
- COMPLETE FAMILY OF PC ENHANCEMENT CARDS
- KEYBOARDS AND MORE...

Distributor or OEM Inquiry Welcome.

Now up to  
**COMBOLITE**  
to meet your needs  
in single turnouts



## Multitech

Committed to Excellence, Quality & Service

For your nearest Distributor: CALL TOLL FREE [800] 838-1848  
In California, CALL (408) 773-8400  
1008 STEWART DRIVE SUNNYVALE, CA., 94086

# Power User

Push your hardware and applications software to the limit with these productivity-enhancing tips from readers.

## Colortalk XVI

The SCREEN command barely gets an honorable mention in Microstuf's user manual for its popular *Crosstalk XVI* communications software. Many users will be surprised to learn that *Crosstalk* allows you to customize its screen colors, either from the command line or from a script file. There are two user-selectable parameters, one to specify which of *Crosstalk*'s screen characters you want to change, and the other to specify which color you want them to be. Enter the command by typing

SC a fb

where SC is the abbreviation for the SCREEN command, a specifies which of *Crosstalk*'s screen characters to change, f specifies the foreground color, and b specifies the background color. Figure 1 lists

### Valid Character Type Codes

N -- Normal characters  
H -- Highlighted characters  
L -- Command Line characters

### Valid Color Codes

K -- Black      M -- Magenta  
B -- Blue      Y -- Yellow  
G -- Green      W -- White  
C -- Cyan

NOTE: Upper Case for Bright  
Lower Case for Normal

Figure 1: These letter codes will produce color screen output with *Crosstalk XVI*.

*Crosstalk*'s character type and color letter codes. Color codes entered in lower case appear normally, and those entered in upper case are displayed in high intensity.

Richard L. Forand  
Douglasville, Georgia

This suggestion sure makes *Crosstalk XVI*'s screen easier to read! I finally found

a reference in the manual, but the explanation is a bit obscure. For example, some experimentation revealed that the color you set for the command line (L characters) won't stay set under almost any circumstances, so it's not worth doing. But the rest of it is great!

## Another Way to Set Printer Options

In a recent Power User column you presented a number of interesting ways to send command sequences to the printer. Here's another, which uses DOS's ability to redirect ECHO statements in batch files to the printer. For example, if your batch file contains

ECHO string > lpt1

the character string "string" will be printed on the default printer. You can send printer command sequences by specifying them as "string". All you need is an editor (such as the IBM *Personal Editor*, *Microsoft Word*, or *XyWrite II-Plus*) that lets you enter the Escape character (ASCII 27) and other nonprinting ASCII characters.

The SETPRINT batch program shown in Figure 2 is designed to set the options I normally use with an Okidata Microline printer. If you don't enter any parameters on SETPRINT's command line, a help screen is presented (see the label :HELP) that tells you which parameters are valid and what they do.

SETPRINT will send any number of valid options to your printer. You just type in the sequences you want sent.

William Perry  
Blacksburg, Virginia

SETPRINT.BAT works fine and demonstrates once again that there are more ways to set up a printer than to skin the proverbial cat. To show SETPRINT in the



Do you spend 4 hours or more each day at your word processor?

NOW YOU CAN SAVE

**45** MINUTES EACH DAY!

...Just By Switching To The Fastest Word Processing Software: *XyWrite II PLUS*.

*XyWrite II PLUS* is lightning-fast! Won't keep you waiting. Ideal for the serious word processing job or the professional writer. Thousands of satisfied *XyWrite II PLUS* users now enjoy the hours and days they save each month.

Time is money! The \$295 you invest in *XyWrite II PLUS* will be repaid in 3 months of time saved. Order now! *XyWrite II PLUS* requires the IBM PC, XT, AT, or compatible hardware, with 192K memory.

Order *XyWrite II PLUS* directly from us, the authors, or call

for a dealer near you. We wrote it, we support it after the sale. That's the best support you can get!

Call now:  
John Hild or  
David Erickson,  
at (617) 275-4439.

**XyQuest Inc.**

P.O. Box 372 Bedford, MA 01730  
(617) 275-4439



# REESTABLISHES THE COST TO PERFORMANCE BASELINE.

*Allen-Harris Industries, Inc. brings you the price and performance that you demand from today's technology. With a unique data repository concept, GP-Tools breaks through the boredom of data base management with GP-File, GP-Print and GP-Utility.*

## GP-FILE

- Data file attributes and screen display formats generated in one step.
- Instantaneous screen displays.
- Data retrieval in a fraction of the time found in other systems... regardless of primary or secondary key assignment.
- Security with encrypted password protection for your data.
- Up to 99 sub-views of your master data file display (each with a password option).

## GP-PRINT

- Design your reports on the screen... graphically!
- Produce an unlimited number of sophisticated reports for each data file.
- Wide variety of printers supported...plus, custom printer option!
- Send reports to screen, printer or disc.
- Modify report formats easily.

## GP-UTILITY

- Modify data file attributes or screen display formats.
- Sort files with parameters to enhance reports.
- Obtain data file structure information.
- Change password for maximum protection.
- File management.



ALLEN-HARRIS INDUSTRIES, INC.  
130 UNIVERSITY PARK DRIVE - SUITE 185  
WINTER PARK, FLORIDA 32792  
TELEPHONE 305/657-1144

GP-TOOLS a division of Allen-Harris Industries, Inc.  
GP-TOOLS includes GP-File, GP-Print and GP-Utility  
CIRCLE 239 ON READER SERVICE CARD

# \$69<sup>95</sup>

To Order Or For More Information:

Call 1-800/821-2165

In Florida 305/657-1144 (collect)

Major Credit Cards Accepted

```

echo off
if "%1" == "" goto HELP
echo Setting Printer Options:
goto %1      Rem - Go Execute Proper Command
:HELP
cls
echo The Following Printer Commands Are Available:
echo .
echo WIDE - Double Width      COND - Condensed Mode
echo ULON - Underline On      ULOFF - Underline Off
echo BOLD - Double Strike     CORR - Correspondence Mode
echo DATA - Data Proc Mode   ELITE - Elite Mode
echo RESET - Resets Printer   PAGE - Page Feed
echo .
echo Enter: %0 command1 command2 . . . commandN
goto END
:WIDE
echo {a-31} > lpt1
goto SPEAK
:COND
echo {a-29} > lpt1
goto SPEAK
:ULON
echo {esc}{C} > lpt1
goto SPEAK
:ULOFF
echo {esc}{D} > lpt1
goto SPEAK
:BOLD
echo {esc}{T} > lpt1
goto SPEAK
:DATA
echo {esc}{@} > lpt1
goto SPEAK
:CORR
echo {esc}{1} > lpt1
goto SPEAK
:ELITE
echo {a-28} > lpt1
goto SPEAK
:RESET
echo {a-24} > lpt1
goto SPEAK
:PAGE
echo {a-12} > lpt1
goto SPEAK
echo .      Rem - Prompt User
echo . "%1" Sent To Printer
shift      Rem - Shift to Next DOS Parameter
if not "%1" == "" goto %1 Rem - Execute Next Command in
Parameter List
:END

```

Figure 2: SETPRINT.BAT sends printer control codes using DOS's redirect ECHO facility.

magazine, all characters that are to be directed to the printer are printed inside braces {}. Except for the Escape character, which is listed as {esc}, nonprinting codes are shown as o-xxx, where the notation xxx represents the ASCII code, and "o-" means that you should use the Alt key in conjunction with the numeric keypad to

enter the number.

As an alternative to using an editor to generate the ECHO statements, you might use a short BASIC program that prints them to a file. Such a program would contain statements such as:

```
PRINT #1, "echo "+chr$(27)

```

where file number 1 is the open file.

### Speedier MultiMate

Some of us who use *MultiMate* grind our teeth while waiting for the program to "GoTo Page 10" from page 1, or to make any other long-distance move. The time is not an eternity, but when you're sitting in front of the screen, it sure seems like it goes on forever.

I have discovered a way to speed up this and other processes in which *MultiMate* accesses the disk containing the file. The "trick" simply involves installing a RAMdisk, such as IBM's VDISK, in extra memory. This works so well that if you don't have extra memory on your system, I recommend getting some.

Assuming your RAMdisk is drive C:, you reset *MultiMate* (use Item 7 from the Main Menu) to use drive C: instead of the normal drive B:. All subsequent work that causes *MultiMate* to go to the disk will thus be done in RAM (that is, on the RAMdisk) instead of on disk. The improvement in performance is truly astounding.

You'll have to copy any existing files from your floppy disk to the RAMdisk before you start *MultiMate* and then copy them back again when you're done. As an alternative, I use *One-Key DOS Plus* (from Power Up! Accessory Software), which allows DOS commands to be issued from inside *MultiMate*. That way I can make "backup" copies to my floppy disk whenever I want.

Rev. Gerald T. Chinchar, S.M.  
Dayton, Ohio

Your solution works fine, not only for *MultiMate*, but for any word processor that leaves part of the current working file on disk. That includes, among others, *Microsoft Word* (whose documentation advises you both on correct RAMdisk installation procedures and on how to save files on the floppy without special utility software), *EasyWriter II*, and *DisplayWrite 2 and 3*.

You should also consider a RAMdisk when using any application where data management or program access is disk-intensive. Candidates include database managers, along with compilers, assemblers, and linkers. A RAMdisk should also be considered for programs that are made up of large overlays that are swapped to and from disk. *EasyWriter II* and *Word* are good examples.

**Rightside Up LaserJet**

I know this is supposed to be a high-tech column, but I have a workable low-tech solution to a problem that has annoyed me and every other Hewlett-Packard LaserJet owner I know. Although it's a great printer, the LaserJet collates its output backwards: When you pick up your output, the last page is on top of the stack, and the first page is on the bottom. This forces you to sort the paper in order to put your report together in the correct order.

Getting the LaserJet to collate in the correct (rightside up) sequence requires forcing the machine to turn the pages over after they are printed. My method for doing this is as simple as throwing the standard output tray (attached to the output slot) into the trash.

Replace the standard output tray with the cardboard top from a box of ordinary word processing paper. The top is slightly

larger than 8½-by 11-inch paper, and so it "jams" nicely under the output slot on the LaserJet. Once the box is installed, the top of a sheet of paper coming from the printer falls gently into one end of the box, "trips," gently turns over, and falls into the boxtop with the printed side down. When your report has printed through completely, it will now be collated in the correct page order.

And they said common sense disappeared with the RAM chip!

Jonathan Lazarus  
Vice President, Editorial  
Ziff-Davis Corporation  
New York, New York

*Well, I'll be a . . . This suggestion even works its low-tech magic on my Canon PC-25 copier, and I have to believe it will work with any of the current crop of Canon-engined laser printers.*

**Alternative Turbo Cursor Size**

In Power User Volume 4, Number 16, Steve Hall showed how to change the cursor size in Turbo Pascal with the BIOS Interrupt 10h. Your readers might like an alternative that uses the Turbo predeclared array PORT. I've added a third parameter to make the cursor invisible, if desired. The cursor size is controlled by a 10 written to output port 948, followed by the cursor start position in 949. Then, an 11 is written to output port 948, followed by the cursor start position in 949.

Michael A. Heuring  
Bloomington, Indiana

*I bet you have a monochrome display, Mr. Heuring! I remember when I wrote programs that worked only on the monochrome: there was a lot of work to do when I added a color/graphics display to my system. That's one reason why it's always safe*

## IBM CREATE YOUR OWN APPLE DATABASE

THE DATA REPORTER SERIES---the most FLEXIBLE, more POWERFUL than any other database, FASTER because it manipulates data in RAM as well as on the disk drives, EASY to use because it allows the user to choose from the screen any option to perform the database functions as well as create a database, integrates the database with word processing, merging of text into the database, graphics and statistical analysis to measure what has been entered into the database. NO COMMANDS TO REMEMBER, all functions are on the screen, menu driven. By-products include screen displays as well as printouts. Applications include programs from A to Z; ACCOUNTING, INVENTORY, ROLODEX FILES, ZOOLOGY. TECHNICAL SUPPORT 24 HOURS PER DAY. FREE ELECTRONIC MAIL. ORDERS CALL 800-441-6666 DIAL 10# 706-8000 INFORMATION 714-380-9437 (DATA REPORTER \$199/PERSONAL RESEARCH AND STATISTICS \$199/REPORT WRITER \$149) SOFTWEST 4418 E. CHAPMAN STE-156 ORANGE, CA 92667

## NEED HANDS-ON TEST RESULTS FOR MICRO COMMUNICATION PRODUCTS?

Now, for the first time, there's an information service that ANALYZES AND TESTS all the hardware and software products you need to link your pc's to corporate mainframes, minis, data services and other pc's.

**INTRODUCING**

## Data Decisions PC COMMUNICATIONS

Whatever you're looking for—from dial-up modems to wideband hardwired networks—PC Communications covers it all, tests it all—and gives you independent expert evaluations you can trust.

To find out more about PC Communications, just fill out and send in the coupon. Or better yet PHONE TODAY!

**609-354-5100**

☐ **YES!** I want to know more about PC Communications.

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

TELEPHONE \_\_\_\_\_

A308

**Data Decisions**

20 Bruce Road, Cherry Hill, NJ 08034  
609-354-5100

```

VAR      TOP,BOTTOM : BYTE;
        CH           : CHAR;
PROCEDURE SET_CURSOR (TOP,BOTTOM : BYTE; CURON : BOOLEAN);
VAR VPORT : INTEGER ;
BEGIN
    VPORT := MEMW [$0040:$0063] ;           {video port base address}
    IF NOT CURON THEN TOP:= TOP OR 32;      {turn on no display bit}
    PORT[VPORT]:= 10;  PORT[VPORT+1]:= TOP;  {load cursor start register}
    PORT[VPORT]:= 11;  PORT[VPORT+1]:= BOTTOM {load cursor end register}
END;    {set_cursor}

BEGIN {main program}
WRITE('Do you want the cursor to disappear?(y/n) ');
READ(CH);
WRITELN;
IF CH IN ['N','n']
    THEN BEGIN
        WRITE('Enter top line of cursor(0-13): ');
        READLN(TOP);
        WRITE('Enter bottom line of cursor(0-13): ');
        READLN(BOTTOM);
        SET_CURSOR(TOP,BOTTOM,TRUE)
    END
    ELSE SET_CURSOR(TOP,BOTTOM,FALSE)
END.    {main program}

```

Figure 3: A subroutine to set cursor size in Turbo Pascal. The two predefined arrays MEMW and PORT are used to read data directly from memory and output data to a port.

## SCIENTIFIC POP-UP CALCULATOR

Now you can have all the power  
of the HP-11C plus more,  
right on your PC!

### INTRODUCING THE KSH-1 FULL FUNCTION POP-UP CALCULATOR

The KSH-1 is:

- 20 to 130 times faster than the hand-held. (8087 Version).
- Able to insert results directly into foreground program.
- Graphically presented on screen.
- Able to save/recall programs to disks.
- Operable in hex, binary, octal and decimal modes.

•• Plus many other features!••

**4995** either plain or 8087 version

**5995** both versions

Add \$3 s/h, Visa, MC, Check, MO

Tenn. add 7.25% sales tax

**K SOFTWARE HOUSE**

Rt. 2 Box 8381  
Unionville, TN 37180  
(615) 294-5090



30-Day Money  
Back Guarantee

## The Little Black Book™

### Publish the Most Important Book You'll Ever Own.

Names here, phone numbers there, addresses and notes everywhere. That's why we created The Little Black Book. With it, an IBM Personal Computer can capture, sort and manage your business contacts. And print them into an "address book" that fits your shirt pocket (leatherette cover included).

If you have a modem, The Little Black Book will dial the numbers automatically. Right through SPRINT, MCI, etc. No modem? Load LBB as a "Pop-Up" and get personal white and yellow pages for your PC. And your pocket.

Make a different book for home, business and the road. Buy one program and make books for everyone in the company. All for \$49.95. Complete.

Call now for info or to order risk-free:

**(800) 621-4292**

**(800) 331-9113 in Calif.**

*Handy Software for Busy People*

**CYGNET**

1290 Lawrence Station Road, San Rafael, CA 94909  
© 1986 Cygnit Technologies, Inc.



CIRCLE 343 ON READER SERVICE CARD



# BUY THE GREEN MARKET!!!



**IBM**  
MAINSTREET ENHANCED PC  
(equivalent to XT) 256K,  
1 Floppy Drive,  
10 MEG Hard Disk  
**\$2040**

**COMPAQ**  
DESKPRO  
DESKPRO 30  
40K RAM, 2 Floppy  
Drive, 20 MEG  
Internal Monitor  
**\$2999**

## WE'LL GIVE YOU... 10 GOOD REASONS TO BUY FROM MAINSTREET COMPUTER

**SERVICE** — Our staff's courteous knowledgeable and ready to help

**PRODUCTS** — The best products from the biggest names

**PRICE** — We're competitors... Call us for the latest quotes

**HONESTY AND STABILITY** — If you would like someone call our banker, Scott Gidley, Vice President, High Tech Group, Interbank Bank, Austin, TX (512) 395-2025

**SUPPORT** — Our tech support people can talk you through it guaranteed!

**SYSTEMS** — We excel in putting together a system to fit your needs. We assemble, test and burn in all systems.

**SHIPPING** — FREE... on most orders

**WARRANTY** — On most products we double the manufacturer's warranty period. If it breaks, our technicians will issue a return authorization. If an item is D.O.A. we pay freight both ways.

**PAYMENT** — If your check is good we'll take it! If we'll ship on account of business and personal checks — no wait. We accept VISA, MasterCard, American Express and Discover. Ask about C.D. terms.

**CORPORATE ACCOUNTS** — Ask for corporate accounts representative.

**HARD DRIVES\***  
Includes cables, controller,  
manual and software

10 Meg Internal... \$409  
20 Meg Internal... \$525  
30 Meg Internal... \$695

84K RAM  
\$1<sup>00</sup> per chip  
256K RAM  
\$41<sup>00</sup> per chip  
Ongoing Pricing Available

### TAPE BACKUP\*

10 Meg Complete from 6375  
Covers 40 MEG Encl... \$949  
Intenday 10 MEG... \$375  
10 MEG... \$395  
\*EXTERNAL SYSTEMS... ADD \$150

### MODEMS

HAYES 1200 EXTERNAL... \$595  
HAYES 1200B INTERNAL... \$749  
HAYES 2400 EXTERNAL... \$649  
TEKA 3275... \$688

### BUSINESS SOFTWARE

ASHTON-TATE dBase III... \$375.00  
dBase III... \$375.00  
Framework... \$399.00  
BORLAND Superdel... \$49.00  
Turbo Pascal V3... \$39.00  
Turbo Pascal 8087... \$40.00  
Turbo Pascal 800... \$40.00  
Turbo Pascal 8087/800... \$49.00  
Turbo Turbo... \$25.00  
Turbo Turbo... \$25.00  
Graphics ToolBox... \$35.00  
Sedakis Protected... \$30.00  
Sedakis Unprotected... \$30.00  
CENTRAL POINT Copy II PC... \$25.00  
PUNG SOFTWARE Ideaway... \$37.00  
H&S & GELLER Check-Book II... \$19.00  
FORWARD SOFTWARE Total Project Mgr... \$275.00  
HAYES SmartComm... \$99.00  
H&S PC Paintbrush or ThinkTank... \$19.00  
INFOCOMM Connective... \$285.00  
LIFETIME Volunteer Deluxe... \$159.00  
LIVING VIDEO/TEXT ThinkTank... \$109.00  
LOTUS DEVELOPMENT 1-2-3... \$299.00  
Symphony... \$499.00  
MDS Knowledgebase... \$275.00  
MICROPS Wordstar 2000... \$275.00  
Wordstar 2000... \$319.00  
Wordstar Prolog... \$249.00  
MICROREM Release 5000... \$355.00  
MICROSOFT Chart... \$159.00  
Multiplan... \$119.00  
Mosaic... \$129.00  
Project... \$159.00  
Word... \$119.00  
Flight Simulator... \$35.00  
MICROSTUFF Contrast XVI... \$99.00  
MULTITASK Version 3.5... \$39.00  
PETER NORTON Norton Utilities... \$49.00  
POWER BASE Power Base 2.1... \$249.00  
QUAD SOFTWARE Clipwrite... \$40.00  
Disk Explorer... \$40.00  
Zero Disk... \$40.00  
ROSOFT Frisky... \$59.00  
SOFTSYTE Fun Works... \$55.00  
SOFTWARE ARTS Spotlight... \$49.00  
SOFTWARE GROUP Enable... \$319.00  
SOFTWARE PUBLISHING PPS-RTA... \$85.00  
Flak... \$85.00  
Write... \$85.00  
SORMIC IUS Superatic 5... \$179.00

### IBM\*

IBM® AT™ — System unit keyboard 1 1/2 MB 6.1 360 K disk drive 20 MB Hard Disk and AST 10 1/2 K RAM... \$4099  
SUPER PC™ — IBM® PC, 400 K RAM, AST Super Plus, 2 1/2 half floppy drives 20 Meg hard disk tape backup... \$2334  
XT type power supply... \$2334  
SUPER PC™ — IBM® PC, 204K, one floppy drive 10 MEG hard disk tape drive XT type power supply... \$2375  
IBM® PC 2-20 — 256K RAM 2 1/2 half high floppies 10 MEG hard disk... \$2259  
IBM® PC 10 — 256K RAM 2 1/2 half high floppies 10 MEG hard disk... \$2159  
EXECUTIVE TURBO — IBM® PC, 256K floppy 10 MEG tape drive XT type power supply Orchid Turbo 640K... \$2695  
MAINSTREET ENHANCED PC™ — Equivalent to XT™ — IBM® PC, 256K, 1 floppy drive 10 MEG disk... \$2090

### COMPAQ\*

MAINSTREET ENHANCED DESKPRO™ — Equivalent to Model 4, 2 1/2 half floppies 10 Meg hard disk tape backup... \$2495  
40K Monitor... \$2495  
COMPAQ PORTABLE — 250K 360K drive 10 Meg drive Functional equivalent to Compaq Plus... \$2546  
16 MEG UPGRADE FOR COMPAQ... \$549

### HARDWARE

A/R Switch Box, 2 Printers on LPT1... \$449  
AST Advantage™ 128K... \$449  
AST Snapshot Plus 48K on Sidekick... \$244  
AST Snapshot Plus 104K on Sidekick... \$249  
AST I/O — Serial Clock Software... \$129  
CDC 360 80 Floppy Drive... \$129  
Everset Editor — Color Menu Graphics... \$299  
Everset Modern 1200 Baud... \$220  
Everset Graphics Edge... \$299  
Floppy Disk Controller... \$129  
Hercules Graphics Card... \$329  
Hercules Color Card... \$329  
Mainstreet Hard Drive (Raptor Controller)... \$129  
Mainstreet Mono Graphics Card... \$129  
Mainstreet Memory Expansion 0-512K... \$135  
Hewlett-Packard Half Height Floppy... \$99  
Orchid Turbo 160 on 128K... \$175  
Orchid Turbo 640 on 160 Includes Piggyback... \$246  
Pinnacle Modular Graphics Card... \$125  
Pinnacle 5-Pack SE-R Color RAM... \$175  
Pony-Coin Card, Multitasking Plus Video... \$395  
Tandem Inck Full Height Floppy... \$125  
TEC V18 Half Height Floppy... \$109  
Toscar Captain 16 SE PAR Clock... \$189

### POWER

DATASHIELD AT800... \$489  
Risc up power 600 Watts... \$349  
DATASHIELD 1700... \$349  
DATASHIELD PC200... \$285  
DATASHIELD 1100... \$19  
Super Protector II Plus  
DATASHIELD 585... \$49  
DATASHIELD 475... \$34  
Intelligence Masterpiece... \$99  
XT TYPE Power Supply... \$95

## TO PLACE AN ORDER CALL 1-800-426-MAIN

EPSON FX-80+... \$335  
EPSON LX-100... \$450  
EPSON FX-100+... \$475  
EPSON LX-80... \$215  
TOSHIBA 1340... \$589  
TOSHIBA 351... \$1299  
TOSHIBA 1351... \$1100



### 24 Hour Bulletin Board Service

• UPLOAD • SIGS • MAIL • DOWNLOAD • ORDERING  
512-321-7317  
ALL NON-ORDER CALLS - 512-321-4406

EPSON  
CITIZEN NEC  
TOSHIBA OKIDATA  
NEC CALP... \$449  
CITIZEN MSP-15... \$549  
CITIZEN MSP-10... \$349  
OKIDATA 182... \$439  
OKIDATA 192... \$549  
OKIDATA 193... \$699  
OKIDATA 84... \$449

### MONITORS

AMDEK 310A... \$179  
PRINCETON MAX-12... \$179  
PRINCETON MAX-12... \$475  
TAKAN Monochrome... \$145  
TAKAN 425 COLOR... \$449  
TAKAN 440 Hi-Res... \$599  
ZENITH AMBI II... \$140



**MAINSTREET**  
COMPUTER CORPORATION

1025 Main Street • Bastrop, Texas 78602 • 1-512-321-4406  
To Place an Order, call 1-800-426-6246

## POWER USER

er to go through the BIOS.

Your method will work for a color/graphics display, as well, if you first retrieve the port address for the video controller from the BIOS data area and use that instead of the monochrome display ports 948 and 949. This is done with another Turbo predefined array called MEMW. Figure 3 shows a revised SET\_CURSOR subroutine that uses this method, together with a small program to test it.

### WordStar Directory Changer

I've written a small assembler program called CD.COM (see Figure 4) that lets me change my working subdirectory while I'm in WordStar simply by pressing a function key and entering the path name for the new one.

I've installed WS.COM so that pressing function key F1 while in the WordStar Opening Menu issues an "R" (run) command, specifies CD as the name of the program to run, and finally sends a carriage return (M) to execute the command. My CD.COM program then prompts you to enter a path name. To switch subdirectories, all you have to do is type in a path name and press the Enter key twice.

Carl E. Wenger  
Columbia, Maryland

*This trick beats having to quit WordStar, switch subdirectories in DOS, and then reload. Note, however, that you have to include an initial backslash or the program won't work (for example, use \ARTICLES\SEPT rather than ARTICLES\SEPT).*

It may be better to change a function key other than F1, since most WordStar users dedicate F1 to some sort of file-sav-

ing command. F5 is a likely candidate. To change the F5 function key so that it first issues the R command, specifies CD as the program to run, and then sends a carriage return, create a WordStar file called SCRIPT that contains three lines, with a carriage return after each

```
e 694 4 52 43 44 d 2a 2a
w
q
```

Then make a copy of WordStar called WSCOPY.COM. Make sure DEBUG.COM is on your disk, and type

```
DEBUG WSCOPY.COM < SCRIPT
```

To change keys other than F5, change the 694 number as follows:

```
670 for F1
679 for F2
682 for F3
68b for F4
69d for F6
6a6 for F7
6af for F8
6b8 for F9
6cl for F10
```

### Share Your Power

Tell the world about your latest technical tips for hardware and software applications through Power User, and we'll pay you \$50 for your trouble, plus an extra \$25 if you submit it on a disk.

If you send a disk, please be sure to include a printout of your submission in order to ensure against damage in transit. Mail your contributions to Power User, PC Magazine, One Park Avenue, New York, NY 10016.

## WE RENT MICRO

**IBM PC; IBM XT  
IBM AT**



- Rentals
- 50NY 25" Video
- Installation
- Service
- Low yearly, monthly and weekly rental rates

We rent modems, HP plotters, dot matrix and letter quality printers

**Immediate Delivery!**

609-662-1010

**MICRORENTALS**

Visa and MasterCard accepted

CIRCLE 332 ON READER SERVICE CARD

## IBM PC AT USERS NEED



the  
**286 \*TURBOSWITCH**

- 33% FASTER  
Runs at 8 MHz
- 100% COMPATIBLE  
Switches to original 6 MHz

You would expect to pay more—Megahertz offers these features for ninety-nine dollars

**MHz**

We have the technology

MEGAHERTZ Corporation  
P.O. Box 1289  
Salt Lake City, UT 84110-1289  
(801) 535-4374

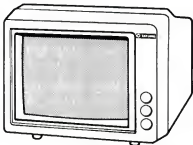
```
100 ' Program for creating CD.COM -- by Carl E. Wenger
110 OPEN "CD.COM" AS #1 LEN=1:FIELD #1,1 AS D$
120 FOR B=1 TO 77
130 READ A$:LSET D$=CHR$(VAL("&H"+A$))
140 PUT #1:NEXT:CLOSE
150 PRINT "CD.COM CREATED"
160 DATA B4,09,BA,38,01,CD,21,90,B4,0A,BA,50,01,CD,21,90
170 DATA 8B,16,51,01,B6,00,01,C2,52,01,90,89,D3,BE,00,00
180 DATA B2,00,88,50,00,90,B4,3B,BA,52,01,CD,21,90,CD,20
190 DATA 80,00,00,00,00,00,00,00,45,6E,74,65,72,28,70,61
200 DATA 74,68,6E,61,6D,65,2E,20,2D,2D,3E,20,24
```

Figure 4: A BASIC program that will create CD.COM.

# TATUNG

**Monitors known  
by the companies they keep.**

**13" Color Monitor/CM-1322** For separate TTL signal output personal computers. High performance 16 color display. Universal switching power supply for wide range power input and low power dissipation. Lock type controls on front panel. Dark tinted CRT.



**13" RGBI High-Resolution  
Color Monitor/CM-1370**  
For separate TTL  
personal computers.

**12" Tilt & Swivel  
Monitor/DM-12VL**  
Data display or  
graphic display device  
with green or amber  
screen for personal  
computer applications.  
(Composite signal input)



**12" High Resolution/MM-1222**  
Data display or graphic display  
device with green or optional  
amber screen for personal  
computer applications.  
(TTL signal input)

**No other monitors offer as much...for so little.**

For a long time we've been making monitors for some of the world's best known, most reliable and best selling computer systems. But now you can buy Tatung Monitors with

our name right up front. Each is compatible with virtually all popular PC's.

Tatung Monitors offer superior resolution and CRT imagery with controls for precise picture "tuning."



**TATUNG**

For complete information call (213)979-7055.  
TATUNG COMPANY OF AMERICA, INC. 2850 El Presidio, Long Beach, California 90810.  
In Northern California, call (408) 732-4671.  
TATUNG SCIENCE & TECHNOLOGY, INC. 1050 S.E. Duane Ave., Sunnyvale, California 94086

CIRCLE 181 ON READER SERVICE CARD



# User-to-User

Readers share their favorite tricks for getting the most out of DOS, BASIC, and their systems in general.

## DATA Made Easy

Both *User-to-User* and *PC Magazine's* Programming column publish BASIC programs that contain lots of DATA statements. We try to make typing them in less of a chore by using pairs of hex digits in evenly spaced columns and by having the programs do any conversions automatically. But typing them in can be tedious, and we receive much mail either asking for a better way to enter DATA or suggesting tricks for saving keystrokes.

The program DATAMAKE in Figure 1 automates the process. All you have to do is tell it the line number of the first DATA statement, how many DATA elements are on each line, and how many total DATA statement lines the program contains. DATAMAKE will then let you enter DATA elements continuously, without having to worry about placing them properly on the correct lines. When you're all finished, DATAMAKE will create a program called

DATA.BAS that you can add to the non-DATA part of your program by using the MERGE command. (Load or type the non-DATA part of your program and then type: MERGE "DATA"—and be sure to save your new program.)

## Color Switcher

Many programs, including "new generation" word processors such as *Microsoft Word*, use the bit-mapped graphics capabilities of the IBM color/graphics adapter's high-resolution mode. However, all the sophisticated on-screen italics and high-resolution graphics are limited to one color (usually white on black). Staring all day long at a black-and-white RGB screen can lead to eyestrain.

It's simple to program the color/graphics adapter to display 1 of 16 colors on a black background in high-resolution mode. The GCOLOR.BAS program in Figure 2 creates a short file called GCO-

```
100 ' DATAMAKE.BAS -- by PC Magazine
110 SCREEN 0:COLOR 7,1,1:KEY OFF:LOCATE ,0:DEFINT A-Z:CLS
120 DEF FNST$(Z)=MID$(STR$(Z),2+(Z<8))
130 INPUT "Enter line number of the first DATA statement: ",L
140 INPUT "How many entries on each DATA statement line: ",E
150 INPUT "How many total DATA statement lines are there: ",T
160 OPEN "DATA.BAS" FOR APPEND AS #1
170 CLS:LOCATE 4,1:PRINT "Enter DATA value, then hit Enter: "
180 FOR A=1 TO T:IF A MOD 17<>0 THEN G=G+1:GOTO 200
190 FOR J=6 TO 12:LOCATE J,1:PRINT STRING$(80,32):NEXT J:G=1
200 DS=FNST$(L+10*(A-1)):PRINT #1,DS;CHR$(32);"DATA";CHR$(32);
210 LOCATE G+5,1:PRINT #1,DS;CHR$(32);"DATA";CHR$(32);
220 FOR B=1 TO E:LOCATE 1,1:PRINT "DATA LINE: ";DS
230 LOCATE 2,1:PRINT "POSITION ON DATA LINE: ";B
240 LOCATE 4,35:INPUT "",AS:IF AS="" THEN BEEP:GOTO 240
250 Z=LEN(AS):LOCATE G+5,Y+LEN(DS)+7:PRINT AS;Y=Y+Z+1
260 PRINT #1,AS;
270 IF B<E THEN PRINT #1," "; ELSE PRINT #1,CHR$(13)
280 IF B<E THEN PRINT #1," "; ELSE PRINT CHR$(13)
290 LOCATE 4,35:PRINT STRING$(20,32):NEXT Y=Y+1:NEXT B:CLOSE
300 LOCATE 25,30:PRINT "DATA.BAS created.";LOCATE 1,1
```

**Figure 1:** Program to create DATA statements automatically. When you're all done, DATAMAKE will create a program called DATA.BAS that contains the DATA statements. Type the non-DATA part of the original program that contained the DATA statements, and then type MERGE "DATA" to append the DATA statements DATAMAKE created. Then save the resulting program.

# Compare These Prices

## IBM Products

### Software

	Bellwether	List
Multimate	\$297.00	\$495.00
Microsoft Word	\$225.00	\$375.00
Smart Software System	\$537.00	\$895.00
Microsoft Chart	\$150.00	\$250.00
Desk Organizer	\$117.00	\$195.00
Word Perfect	\$297.00	\$495.00
Wordstar 2000	\$297.00	\$495.00
Spotlight	\$30.00	\$150.00
Harvard Project Manager	\$237.00	\$395.00
Microsoft Flight Simulator	\$30.00	\$50.00
Managing Your Money	\$120.00	\$200.00
Thimble	\$117.00	\$195.00
Supercalc 3	\$237.00	\$395.00
Side Kick (Unprotected)	\$51.00	\$85.00
Multiplex	\$117.00	\$195.00

### Hardware

AST Six Pack - w/64K	\$277.00	\$395.00
Hercules Color Card	\$160.00	\$245.00
Hercules Graphics Card	\$125.00	\$195.00
Microsoft Mouse	\$127.00	\$195.00
M.S. PC Mouse w/ Software	\$127.00	\$195.00
Isaac 420 (1024 w/ Cable)	\$380.00	\$580.00
Epson MX-80 Ribbon	\$6.00	\$13.00
Paradise Multisync Card	\$300.00	\$450.00
IDE 1200 300 Modern Card	\$355.00	\$545.00
Elephant DS DD 3 1/4	\$31.00	\$45.00
Match III Joystick	\$33.00	\$55.00

## CALL TOLL FREE

1-800-824-8064  
 COLORADO AND CANADA  
 CALL COLLECT  
 1-303-442-2806

For fast delivery send cashier's check, certified check or money order. Personal or company checks allow 3 weeks to clear. Shipping and handling, add 5%. C.O.D. add \$2.00. MasterCard and Visa send card number and expiration date and add 3%. Colorado residents add 5.75% sales tax. Prices subject to change without notice. All returns must have authorization number. Call (303) 442-2806 to obtain one. Mail or phone orders accepted.

Hours 7:00 a.m.-7:00 p.m. Mon-Fri

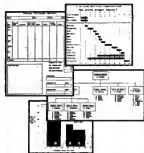
VISA

MasterCard

## Bellwether Software

P.O. Box 2238 Boulder, CO 80306  
 CIRCLE 173 ON READER SERVICE CARD

# NOW YOU CAN DO ALL THIS WITH OR WITHOUT A GRAPHICS BOARD...



## INTRODUCING MONOGRFX™ ONLY \$69.95

- Makes it easy and inexpensive to create organizational diagrams, Gantt charts, everyday business forms and other free-form line and block drawings on your IBM PC.
- Integrates graphics and text—including ASCII files created with other popular programs.
- Lets you use three different character sizes (in normal or condensed print) on sheets as large as 11" x 14".
- Supports over 50 popular printers, plus most monochrome and color/graphics display adapters.

In short, MonoGrafx provides the features you need to create impressive reports, presentations, proposals, hand-outs—even on-screen slide shows!

### TRY IT RISK-FREE!

Send \$69.95 plus \$3 shipping (\$10 outside U.S. and Canada) to: Analytics International, Inc., 1365 Massachusetts Avenue, Arlington, MA 02174. (Mass. residents, add \$3.50 tax.)

MasterCard and VISA orders CALL TOLL-FREE 1-800-992-0085. (In Massachusetts, dial 617-641-0400.)

We'll rush you your MonoGrafx software package right away. If you're not completely satisfied, just return it within 15 days of delivery for a full, unquestioned refund or credit. Our guarantee is that pure and simple.

- ☐ YES, please rush me MonoGrafx to try risk-free for 15 days. My check, money order or company P.O. is enclosed.
- ☐ Send me more free information about your software for busy people!

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ ZIP \_\_\_\_\_  
Phone \_\_\_\_\_ Ext. \_\_\_\_\_

IBM PC is a registered trademark of International Business Machines Corporation. MonoGrafx is a service also available on IBM's REGISTRATION SYSTEMS. © Copyright 1985, Analytics International, Inc.

**Analytics International, Inc.**  
1365 Massachusetts Avenue  
Arlington, MA 02174

## USER-TO-USER

LOR.COM that allows you to access this color capability, so you can use programs such as *Microsoft Word* in yellow-on-black, green-on-black, or any other monochrome combination on a color monitor.

GOLOR.COM intercepts the PC's standard keyboard routine to determine whether you have hit the keys required to trigger GOLOR. Each time you press the two trigger keys simultaneously (the Ctrl key and the \ key) in high-resolution mode, GOLOR increases the screen color or by incrementing the 6845's color register, until you reach color 15; after that, GOLOR starts back at color 0.

A side effect of GOLOR is that in text mode, pressing the trigger key causes the border color to change, without disturbing the text.

David Ting  
Silver Spring, Maryland

*This program was obviously designed on a*

PC or PC-XT, since the Ctrl-\ combination makes much more sense on these key-boards than on the AT. And, while it works as advertised, it sometimes choked when other memory-resident programs, such as SideKick, were active. Interestingly, it shows how one instruction can mean three different things, depending on the screen mode. In BASIC's SCREEN 0, hitting Ctrl-\ changes the border color. In SCREEN 1, it changes the color of the background. And in SCREEN 2, it changes the text.

Does anyone know how, aside from XORing every video byte, to change the background in SCREEN 2 from black to anything else? If so, send us the solution (we'll double the normal fee for a hi-res background color trick that works).

### Cursor Toggling

A friend of mine who uses *Electric Desk* found that the screen cursor disap-

```
100 ' Program for creating GOLOR.COM
110 CLS:PRINT "Checking DATA; please wait..."
120 FOR B=1 TO 11:FOR C=1 TO 17
140 READ A$:IF C<17 THEN 160
150 Z$=Z$+VAL(A$)
160 NEXT:NEXT
170 IF Z$=12898 THEN RESTORE:GOTO 200
180 PRINT "ERROR: CHECK THE LAST NUMBER IN"
190 PRINT "EACH DATA STATEMENT--THEN REDO":END
200 FOR B=1 TO 11:FOR C=1 TO 16
220 READ A$:TTL=TTL+VAL("&H"+A$)
230 NEXT
240 READ S:IF S=TTL THEN 270
250 PRINT "DATA ERROR IN LINE";B*10+330
260 PRINT "CHECK FIGURES AND REDO":END
270 TTL=0:NEXT:RESTORE
280 OPEN "GOLOR.COM" AS #1 LEN=1:FIELD #1,1 AS D$
290 FOR B=1 TO 11:FOR C=1 TO 16
310 READ A$:LSET D$=CHR$(VAL("&H"+A$))
320 PUT #1:NEXT:READ DUMMYS:NEXT:CLOSE
330 PRINT "GOLOR.COM CREATED"
340 DATA 6A,90,00,00,00,00,00,00,00,00,00,00,00,50,53,51,857
350 DATA 52,57,56,1E,06,9C,2E,FF,1E,09,01,BB,40,00,0E,DB,1400
360 DATA 8B,1E,1C,00,3B,1E,1A,00,74,39,83,EB,02,83,FB,1E,1265
370 DATA 73,03,BB,3E,00,8B,17,81,FA,1C,2B,75,26,89,1E,1C,1329
380 DATA 00,2E,FF,06,05,01,2E,83,3E,05,01,0F,74,0B,BA,D9,1103
390 DATA 03,2E,A1,05,01,EF,EB,0B,00,00,00,2E,09,1E,05,1250
400 DATA 01,EB,DE,07,1F,5E,5F,5A,59,5B,58,CF,BB,00,00,8E,1576
410 DATA DE,A1,24,00,2E,A1,03,01,A1,26,8E,2E,A1,00,01,C7,1251
420 DATA 06,24,00,0D,01,8C,0E,26,0B,BB,00,2E,09,1E,05,664
430 DATA 01,2E,C7,06,03,01,00,00,2E,C7,06,07,01,DA,03,BA,1050
440 DATA 6C,01,CD,27,00,00,00,00,00,00,00,00,00,00,00,00,353
```

**Figure 2:** Program to create GOLOR.COM for IBM color/graphics adapters (and DOS 2.x) only. Once you've created and run GOLOR.COM, you can change colors by hitting the Ctrl and "\ keys simultaneously. The part of the screen changed depends on the SCREEN mode: in BASIC's SCREEN 0 it will change the border, in SCREEN 1 the background, and in SCREEN 2 the foreground.

## USER-TO-USER

pears whenever he exits from the program. Figure 3 contains instructions for using DEBUG to create a small file called CURSON.COM to turn the cursor back on.

CURSON.COM was written for a color or display. To adapt it to work on a monochrome display, change the 0607 in the first MOV instruction to 0C0D. Also, if you want to turn the cursor off, change the same first instruction to 0F00.

Philip Karras  
Reston, Virginia

*It's a shame that software often fails to reset the system, and this program helps restore it to normal. However, since many well-written programs do go to great pains to reset everything, you can run one and then exit to make everything shipshape. Loading something like BASICA or WordStar and then quitting will often clean things up. Anyway, normally it's not a tragedy to lose your cursor.*

```
A>DEBUG CURSON.COM
```

```
File not found
```

```
-A
```

```
xxxx:0100 MOV CX,0607 ;Color cursor on
```

```
xxxx:0103 MOV AH,01 ;Cursor type
```

```
xxxx:0105 INT 10 ;Screen interrupt
```

```
xxxx:0107 INT 20 ;Return to DOS
```

```
xxxx:0109
```

```
-RCX
```

```
CX 0000
```

```
:2
```

```
-H
```

```
Writing 0009 bytes
```

```
-Q
```

**Figure 3:** Instructions for creating CURSON.COM on a color screen. Type in everything underlined, and hit the Enter key at the end of each line. Don't type the comments following the semicolons, and ignore every xxxx—the numbers that appear here will vary from system to system. For monochrome displays, change the 0607 in the first MOV instruction to 0C0D. To create a program that will turn the cursor off, change the same first instruction to 0F00, and start the process in the first line with DEBUG CURSOFF.COM.

### Fast Monitor Switch

Instead of substituting different values for the statements DEF SEG=&HB000 for the monochrome adapter, or DEF

SEG=&HB800 for the color/graphics adapter, simply include the statement in Figure 4 at the beginning of a program.

Thereafter, the statement DEF SEG=

## Immediately Available — Large Quantities

### The ATI-1000... presented by ATI

#### IBM AT<sup>®</sup> Compatible Motherboard

- Up to 640-kb main memory (1Mb on-board optional)
- 8 I/O Slots
- Same Dimensions as IBM AT<sup>®</sup> (12 x 13 inches)

Suggested OEM price \$1,095. (orders of 10 units or more);  
volume discounts available.

Also available: Power Supplies, Cases and Keyboards.

\*IBM AT is a trademark of International Business Machines

#### New Product ATI-2000

- 8MHz w/o Wait State
- 67% Faster than IBM AT<sup>®</sup>
- Call for price



AtTronics International, Inc.

520 Valley Way • Milpitas, CA 95035 • (408) 943-6629 • (408) 263-6533

CIRCLE 108 ON READER SERVICE CARD

# DISK MECHANIC<sup>T.M.</sup>

The ULTIMATE Backup, Analyze & Repair Utility  
The Disk Toolkit NO IBM PC Should be Without  
Protects Your Software Investment

### BACKUP TOOLS:

- Can Backup Most Every Diskette
- SUCCEEDS where others fail!
- Works Manually or Automatically
- Creates "Protected" Diskettes
- Many Additional Analysis Tools

### SECTOR TOOLS:

- Examine/Print Sector Data
- Modify (ZAP) Sector Data
- Compare, Copy & Zero Sectors
- Search Sectors For Data

### FILE TOOLS:

- Show Disk & File Allocation
- Display & Alter File Data
- Repair Damaged Disks
- Recover Erased Files
- Alter "Hidden" Status
- Search Files For Data

### HACKER TOOLS:

- Modify Floppy Disk Controller Parameters
- Supports All FDC R/W Commands

DISK MECHANIC works with all standard IBM PC disk formats including "protected" diskettes with mixed track and sector sizes, blank and high track formatting, CRC errors, and single or double sided drives. DISK MECHANIC requires an IBM PC with 128K of memory or COMPAT with 192K of memory, DOS 1.10, and 2 floppy disk drives. DISK MECHANIC includes a detailed 48 page instruction manual. To Order DISK MECHANIC send check or money order for \$70 plus \$3 for shipping (Mass. res. add sales tax.) to: MLI MICROSYSTEMS, Box 625, Framingham, Mass. 01701 or Call (617) 825-2055 for MasterCard or VISA orders. Dealer/Distributor inquiries welcome. ©1983 MLI MICROSYSTEMS.

## MLI MICROSYSTEMS

CIRCLE 340 ON READER SERVICE CARD

## USER-TO-USER

ADAPTER will work for either the color/graphics or monochrome adapter. If a system has both adapters, this technique will default to monochrome since the statement in Figure 4 polls the system to see how the switches are set.

Dave Bruehl  
Norman, Oklahoma

*This is indeed handy, although since it reports the system board switch settings rather than which monitor is active, you may run into trouble on a two-monitor system if you've MODEd from the default to the nondefault monitor. According to PEEK and POKE expert David Schneider, you can determine the active monitor by typing DEF SEG=0:PRINT PEEK*

```
100 DEF SEG=0:ADAPTER=48000-(64000*((PEEK(1040)AND 48)/16)<3))
```

**Figure 4:** Statement to be inserted into BASIC program that automatically detects which monitor is installed and lets users switch to the proper memory segment by typing DEF SEG=ADAPTER.

***aBudget™***

**A HOME AND PERSONAL ACCOUNTING PROGRAM that means business**

**MBUDGET** has all accounting functions performed by other home accounting programs, but adds unique capabilities for future planning, budgeting and cash flow projection.

**MBUDGET** will teach you successful personal accounting techniques, will help you at tax time.

**MBUDGET** is the only program with date-handling capacity that you never outgrow, the only program that lets you access all your records without limitations, year after year.

**MBUDGET** is written in compiled GBASE II language and has all data processing power of this famous software, but significantly surpasses it in speed. (You don't need GBASE II to run MBUDGET.)

**MBUDGET** provides standard GBASE II-format data files and permits custom processing of data by Lotus 1-2-3, Symphony, dBASE II, dBASE III, etc.

- Simple, menu-based operation. HELP screens, pop-up menus that can be turned ON or OFF to select a desired level of help. All functions are EASY to use.
- Creates a comprehensive "book of records" and automatically keeps it up-to-date.
- Uncompromised in flexibility. Transactions can be added or modified on any date (no monthly or annual "closing" of accounts).
- Data entry screens show current account balances and "last checks entered."
- Features an on-line pop-up calculator for easy entry of amounts.
- Allows "split" transactions between several expense/income categories, etc.
- Provides balances in all accounts, selected subtotals and NET WORTH for any date.
- Extreme search capabilities - data retrieved by multiple user-defined criteria.
- Fast balancing of accounts against an account statement.
- Allows definition and maintenance of a date base of future, planned transactions.
- Provides a "compact reminder," automatically displays future, planned transactions as they become due or past due.
- "Cash flow projection" predicts all account balances for any future date, allows "what-if" studies, monitors "suspicious patterns."
- Monthly budgets by selected expense categories, responses to actual expenses.
- Proves, monthly, allows two levels of user-definable passwords.
- Tracks 31 user-defined accounts, 36 basic expense categories and up to 100,000 expense types. Every account can be defined as a checking account.
- Offers screens, types of printed reports.
- Runs on an IBM PC, AT, XT, 386 PC, COMPAG and other compatible computers, uses DOS 2.0 or 3.0 operating system and is NOT copy protected.
- Requires 640Kb memory, two floppy drives or a hard disk, a dot-matrix printer.

To receive your own copy, including five program diskettes and a 160-page manual in an IBM style ring binder and slip case, send \$155.00 to:

**OAK PARK SOFTWARE, INC.**  
P.O. Box 710 Milwaukee, WI 53201-0710  
or order by phone: (414) 797-7911

Master Card / Visa, C.O.D., money orders, cashiers' or personal checks. Add \$2.00 for shipping and handling. Wisconsin residents add 5% sales tax.

(1123)+256\*PEEK(1124). If the result is 948, monochrome is active; if it's 980, the color/graphics board is active. Using this DEF SEG=ADAPTER trick saves a programming step and ensures that your program will work on color and mono.

### Behind the Eight Ball with DEL

Here's an easy, new, and undocumented feat of prestidigitation. A mere slip of the finger, and much of your current subdirectory or floppy will disappear like magic!

Say you've got a bunch of files whose names don't have extensions, like MOE, LARRY, and JOE. You've also got some with the .BAK extension: MOE.BAK, LARRY.BAK, and CURLY.BAK. May as well get rid of those useless backups.

Nothing to it. You simply type

```
erase *.bak (or del *.bak)
```

Except that after you hit the asterisk over the 8, you accidentally let go of the Shift an instant too late. What you type instead, since the > sign is over the period, is the following:

```
erase *>bak (or del *>bak)
```

You hit the Enter key before you catch the error. And when you look at the directory, you discover the .BAK files are still there. Missing are all of your files whose names lack extensions. MOE, LARRY, and CURLY are gone, and so are PETER, PAUL, and MARY. You may not see it in the directory, but you now have a file called BAK whose length is zero.

O agony! An immediate trip to Norton's UnErase is in order.

It's likely to be a long session. Seeing the > sign, "Dumb DOS" thought you

## \$6 Software

How could it be any good for only \$6? Many capable programmers have written high-quality programs with complete documentation on disk and request a donation from satisfied users. Other program authors just want people to use the programs they have built and found useful. PC-SIG provides a single source of IBM-PC programs for \$6 per disk. Listed below are sets of some of the more popular disks from the library of over 350 disks.

- |  |   |
|--|---|
| <input type="checkbox"/> <b>350-page printed Directory</b> \$8.95  | <input type="checkbox"/> <b>Set of 3 Utility Disks</b> \$18<br>(Disk cataloging program, file modify and restore utilities)                                     |
| <input type="checkbox"/> <b>Set of 5 Introductory Disks and Directory</b> \$36<br>(Includes word processing, filing system, utilities, games, and printed directory) | <input type="checkbox"/> <b>Set of 4 Top Game Disks</b> \$24<br>(Arcade quality games, several on each disk)  |
| <input type="checkbox"/> <b>Set of 3 Financial Disks</b> \$19<br>(Personal general ledger, spreadsheet, stock trading)   | <input type="checkbox"/> <b>Set of Two Genealogy Disks</b> \$12   |
| <input type="checkbox"/> <b>Set of 5 Lotus/Symphony Worksheet Disks</b> \$36<br>(Templates, Tech notes, utilities, macro library)                                    | <input type="checkbox"/> <b>How to Unprotect Popular Software</b> (3 disks) \$12  |
| <input type="checkbox"/> <b>Set of 4 Educational Disks</b> \$24<br>(Typing tutor, history, BASIC tutorial, math tutor)   | <input type="checkbox"/> <b>PC-SIG Directory on Disk</b> (2 disk set) \$12  |
| <input type="checkbox"/> <b>Set of 5 Language Disks</b> \$30<br>(Assembler with tutorial, Logo, XLISP, Fortran)  | <input type="checkbox"/> <b>1 year PC-SIG membership</b> \$15<br>(Receive all PC-SIG publications including printed directory, newsletters, and disk discounts) |

Please add \$6 postage and handling to all disk orders, add \$1.50 postage and handling for the Directory only. California residents add sales taxes too.

Total Enclosed \_\_\_\_\_ by ☐ Check ☐ Visa ☐ MC

Card No. \_\_\_\_\_ Exp. date \_\_\_\_\_

Day phone \_\_\_\_\_ Signature \_\_\_\_\_

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

To order, call:

**PC-SIG** 1030 E. Duane Ave., Suite J Sunnyvale, CA 94086

(408) 730-9291

800-235-6646

800-235-6647 (CA only)



CIRCLE 144 ON READER SERVICE CARD



were trying to redirect the output of the ERASE command into a file called BAK; the output of the ERASE command is nothing at all. Of course, the lone asterisk meant you wanted to erase all files whose names lack extensions. DOS was kind enough to oblige.

Moral: when using the ERASE or DEL command, avoid the Shift keys. Use the asterisk under PrtSc instead of the one over the eight. Or automate things—create a batch file with the single line

del \*.bak

and call it DELBAK.BAT. Then type in DELBAK and you'll never find yourself behind the eight ball.

Stephen Manes  
Riversdale, New York

*Using the PrtSc/asterisk, of course, introduces a whole new headache. If you happen to be leaning on a Shift when you hit this key, you either get a printed page full of junk if your printer is on-line, or a long hang if it's not. This is the price you pay for having only 83 or 84 keys on your keyboard. On the other hand, if you start throwing in dedicated keys to perform one function each, the thing starts looking like a Chinese typesetting machine and sprawls across half your desk. Still, the PC keyboard is such a winner that key sharing isn't as bad as having to use some of the pathetic mushy plastic toy keyboards found on the majority of non-IBM PCs.*

*The batch file is the best solution; I use it myself, except that I add three lines at the very beginning.*

ECHO OFF  
ECHO Ready to del \*.BAK files  
PAUSE

*This reminds me of what I'm doing and gives me one last chance to Ctrl-Break out before a valuable backup file vanishes.*

#### Share Your Discoveries

Tell the world about your latest discovery through User-to-User, and we'll pay you \$50, plus an extra \$25 if you submit it on a disk. If you send a disk, please include a printout to ensure against damage in transit. Mail your contributions to User-to-User, PC Magazine, One Park Avenue, New York, NY 10016. ■

\$199

**LASER PRINT**

\$99

## PERSONAL PRINTING & TYPESETTING ON H-P & CANON LASER PRINTERS

Not Copy Protected

A Complete document formatting and typesetting program for the H-P LASERJET and CANON LASER BEAM Printers. It lets you access laser printer features with 100 short, easily learned, word-like commands embedded in text files. LP works with any word processing editor, spreadsheet (1-2-3 etc.), or other application software. LP is listed by both Hewlett-Packard & Canon.

LASER PRINT provides easy font selection, precise print positioning, graphics design and form generation including the ability to mix (and overlay) graphics and text. LP commands can be entered directly in spreadsheet cells or database report specifications. LP supports command macros, and text & graphics file inclusion. LP can be used to create designs, diagrams, special characters, and computer signatures.

LP enables you to bring your typesetting and printing in-house. It can create forms, letterhead paper, stick-on labels, menus and other printed matter which up to now required professional typesetting. LP gives a custom design look to your documents with MAJOR SAVINGS in printing costs & FAST TURN-AROUND times.

Laser Print is a universal printing program - It provides typeset quality printing for documents from any source. For IBM PCs and Compatibles (PC-DOS & MS-DOS).

Laser Print 1.00 Complete Typesetting W/Graphics Design. (H-P Only) \$99.

Laser Print 2.00 All of the Above + Major Graphics Capabilities. (H-P) \$199.

Laser Print 2.00C Canon Laser Beam Version Of Laser Print. \$199.

#### JANUS ASSOCIATES

Suite 701, 60 Commonwealth Ave., Boston, MA 02116.  
(617) 236-1892 MC/Visa.

Ad Done With LP.

CIRCLE 103 ON READER SERVICE CARD

# Is there an XEDIT compatible editor for your IBM PC? Yes. KEDIT.

- Most XEDIT commands and features
- XEDIT fullscreen layout
- Multiple files
- Split-screen editing
- Redefinable keys
- Enhanced block operations
- DOS command interface
- And much, much more

Mansfield Software Group  
Box 532  
Storrs, CT 06268  
203-429-8402

\$125 plus \$3 shipping  
Demo Version \$10  
MC, VISA, COD, PO, check

XEDIT is IBM's powerful fullscreen editor for VM/CMS

CIRCLE 378 ON READER SERVICE CARD

# What'a way to buy! Fantastic low prices

## HARDWARE

### DISK DRIVES

TANDON TM-100-2 DS/DD	
disk drive	104.95
TEAC 55B 1/2 Height DS/DD	
disk drive 55B	98.50

### HARD DISK DRIVES FOR IBM

<b>HIGH SPEED INTERNAL HARD DRIVES FOR IBM AT</b>	
Complete with software, Mounting rails & instructions. 30Msec Average Access Time.	
ID-40AT 51MB (42MB formatted)	1295.00
ID-60AT 72MB (59 MB formatted)	1495.00
<b>HIGH SPEED INTERNAL HARD DRIVES IBM XT w/CONTROLLER</b>	
51MB (42MB formatted)	1495.00
72MB (59 MB formatted)	1695.00

### INTERDYNE

internal 10MB tape backup for IBM PC/XT	395.00
---	--------

### OMEGA BERNOULLI BOX

20 MB (12 MB in cabinet), 2480.00	
FIXT Autoboot ROM iPC only 89.95	

### RODIME

10MB 3 1/2" shock mounted hard drive, Complete with controller	519.95
--	--------

### TALLGRASS

Hard drive sub system with backup. New! TG-5025	2795.00
Includes interface card for IBM PC	

### TAPE BACK UP SYSTEMS

Sygen 45MB Internal (xt, at)	Call
Sygen 45MB External (xt, at)	Call
Everex 45MB Internal (xt, at)	895.00
Texmac 60MB External (xt, at)	1395.00

### DISPLAY CARDS

#### EVEREX

Graphics Edge	309.95
Edge	299.00

#### HERCULES

Color Card	159.95
Graphics Card (Mono)	309.95

#### PARADISE

Modular Graphics Card	269.95
-----------------------	--------

#### SIGMA

Color 400T i/Taxam 440	Call
Color 400 i/Princeton SR-12	Call

TECMAR Graphics Master	469.00
------------------------	--------

### MEMORY

#### EXPANSION CARDS

##### AST RESEARCH

AST 6-PACK PLUS 64K	229.95
AST 6-PACK PLUS 384K	259.95
For game port option add 34.95	

##### ORCHID TECHNOLOGY

PC Turbo-185 w/Daughterboard	579.00
PC Turbo-186 w/Daughterboard & 8087* support board	749.95
* 8087 optional	

##### QUADRAM QUADBOARD

New! Expanded Quadboard 64K	209.95
384K	249.95

##### TALLTREE SYSTEMS

J RAM-2 w/parallel, serial & clock OK	249.00
New! J RAM-3 256K	269.00
For par. ser. clock add \$120	

### TECMAR

CAPTAIN-64K	194.50
CAPTAIN-384K	209.95

### MEMORY EXPANSION CARD FOR THE IBM AT

Tecmar Maestro 640K	449.00
AST Advantage	Call
Quadram Quadmeig 128K	329.00
Tall Tree i-RAM AT 6K with Software	209.00

64K Memory Upgrade Set	7.95
256K Memory set	44.95
Intel 8087-3	108.95
Intel 80287	199.00

### LOCAL AREA NETWORK

#### AST

AST PC Net Starter Kit	795.00
AST PC Net II Starter Kit	795.00

#### CORVUS OMNINET

Omnishare Software & Card	585.00
Omnidrive 20MB	2450.00
Omnidrive 45MB	3695.00
Transporter Card	369.00

### QUADRAM

Quadnet IX Master Kit	1195.00
Quadnet IX User Kit	599.00
Quadnet IX Wire Card	269.00

### MODEMS

#### ANCHOR AUTOMATION

Volkmodem 12 RS-232	179.95
Cable for PC, Compaq	11.95

#### HAYES

Smartmodem 1200 RS-232	399.95
Smartmodem 1200B with Smartcom II	359.95
Smartmodem 2400 Baud	619.00

### NOVATION

1200+ Internal Modem	329.95
1200+ External Modem	329.95
Novation 2400 Modem	599.95
Includes Mite software	

### QUADRAM

Quadmodem II w/Crossstalk XVI 300/1200	299.00
--	--------

### VEN-TEL

PC 1/2 Card Modem-Internal w/Crossstalk XVI	369.95
1200 Plus-External 300/1200	369.95

### MONITORS

#### PRINCETON

HX-12 RGB Color	449.95
MAX-12 Amber TTL	179.95
SR-12	579.00
SR-12 w/Scan Doubler	795.00

#### QUADRAM

Amberchrome 12" Amber	149.95
-----------------------	--------

#### TAXAN

440-RGB	549.95
BoB board for 440	379.00
420-RGB color	419.95
425-RGB color	429.95
122-12" TTL - Amber	139.95
122-12" TTL - Green	149.95

#### AMDEX

600 Color RGB	419.00
700 Color RGB	459.95
710 Color RGB	569.95

Tecmar Graphics Master recommended with the 710	
---	--

### LASER PRINTERS

APPLE Laserwriter	Call
HP Laserjet	Call
QUADRAM Quadlaser	Call

### PLOTTERS

SWEET-P 8-pen plotter	795.00
SWEET-P 1-pen plotter	295.00

## IBM® HARD DRIVE SYSTEMS

### — FREE —

90-DAY ON-SITE SERVICE  
Included with PC & XT — plus  
ALPHA KEYWORDS PROGRAM  
Free, w/purchase of PC or XT hard dr. system  
Total Value! \$239!

### IBM PC SYSTEMS

- IBM PC 256K • 10MB internal hard drive • 360K floppy drive

**\$2195\***

- IBM-PC 256K • 10MB internal hard drive • 360K 1/2 ht. floppy
- 1.2MB 1/2 ht. floppy (AT compatible) **\$2695\***

### IBM XT SYSTEMS

- IBM XT 256K • 360K drive
- 10MB VI hard drive.

**\$2395\***

- IBM XT 256K • 360K drive
- 10MB internal hard drive
- 10MB internal tape back-up.

**\$2895\***

\*For above systems with 20 MB internal hard drive add \$150.



### IBM AT SYSTEMS

- IBM AT 512K • 1.2 MB Floppy • 20 MB CMI hard drive (40Msec)

**\$3895**

- IBM AT 512K • 1.2 MB floppy drive • 72 MB (59.8 formatted) Prim hard drive (30 Msec).

**\$4850**

### PRINTERS

HR-15 17 CPS	369.00
HR-25 23 CPS	649.00
HR-35 36 CPS	899.00
Tractor Feed iHR 15, HR 25	124.95
Sheet Feeder HR 15/25	199.95

#### COMREX

CRII 19 CPS	299.00
CRI-23 CPS	399.00
CRI-V 36 CPS	599.00

CALL FOR OUR LOW PRICES.

#### JUKI

8100 18 CPS Letter Quality	379.95
6300 40 CPS	699.95

#### NEC

8850 letter quality	Call
3550 letter quality 33 CPS	999.00
2050 letter quality 18 CPS	699.95
Tractor Feed 3550/2050	209.95

#### OKIDATA

Call us for special low prices on all OKIDATA printers.

#### OLYMPIA

Compact R/O parallel/serial letter quality	299.95
--	--------

#### SILVER REED

EXP-550 19 CPS	439.95
EXP-770 36 CPS	799.95
Tractor Feed for EXP-550	124.95

#### TEXAS INSTRUMENTS

855 with Tractor Feed	699.95
865 with tractor	699.00

#### TOSHIBA

P-351 Printer (288 cps)	1149.00
P1340 Printer	559.00

### FLOPPY DISKS

KODAK 5 1/4" (10 pk)	13.50
IBM 5 1/4" (10 pk)	26.95
MAXELL 5 1/4"	13.95
FUJI 5 1/4" (10 pk)	14.95
POLAROID DS/DD	17.95

For quantity prices, please call

### HARDWARE MISC.

DATASHIELD POWER BACK UP PC-200 200 watt (for PC)	295.00
XT-300 300 watts (for XT)	399.00
AT-500 500 watts	649.00

#### DCA INC.

Ima Board 3278 Emulation	899.95
--------------------------	--------

#### EVEREX

Expansion Chassis	695.00
-------------------	--------

#### IMSI

Mouse w/PC paintbrush	118.95
-----------------------	--------

#### KEYTRONICS

New! KB-5151 keyboard	169.95
-----------------------	--------

#### KENSINGTON

MasterPiece	92.50
-------------	-------

#### KOLA

Koala Pad	69.95
Speed Key System	99.95

#### MOUSE SYSTEMS

PC Mouse with PC Paint	139.95
------------------------	--------

## SOFTWARE

WE STOCK A LARGE SELECTION OF SOFTWARE FOR TITLES NOT LISTED HERE, PLEASE CALL US FOR OUR LOW PRICES.

#### ALPHA

Keywords "TOP RATED" ... Special

# without ever compromising on service!

PC OCT. 29, 1985

## COMPAQ PORTABLE SYSTEMS



- 256K
- Two DS/DD disk drives
- Built-in hi-res monitor with graphics
- Parallel printer card
- DOS

**Call or write.**

### COMPAQ PORTABLE HARD DRIVE SYSTEMS

- COMPAQ 256K with 10MB Drive and 1-360K Floppy .....\$2495\*\*  
 COMPAQ 256K with 10MB Drive and 2-360K 1/2 Ht. Drives .....\$2750\*\*  
 COMPAQ 256K with 20MB Hard Drive and 1-360K Floppy .....\$2695\*\*

COMPAQ DESK PRO, **Call or write.**

### MICROSCIENCE INTERNAL HARD DRIVES FOR IBM PC AND XT

Internal 1" height hard drive w/ Western Digital short controller card. 1 yr. warranty

10MB **\$42900** 20MB **\$54900**

### TURN 1 IBM-PC INTO 4

Turn your IBM PC or XT into a true Multi-user system with Multi-PC. Up to 4 users can share a single PC, running the same or different software all under PC DOS. Ideal for the small office. **Call for low price.**

### MSI CARTRIDGE BACK-UP SUBSYSTEM

Low cost high capacity 25MB cartridge tape back-up system for the IBM PC/XT complete in cabinet with power supply. Connects to IBM floppy controller card. Will not use a slot in your PC. Back-up and restore individual files or an entire disk.

**\$888<sup>88</sup>**

**ASHTON TATE**  
 D base II ..... 259.95  
 Ashton Tate D BASE III ..... 339.95  
 Ashton Tate Framework ..... 349.95

**BORLAND**  
 Turbo Pascal 3.0 ..... 38.50  
 Side Kick (protected) ..... 29.95  
 Side Kick (non protected) ..... 44.95  
 Super Key ..... 36.50  
 Turbo Pascal w/8087 support ..... 57.95

**BREAKTHROUGH**  
 Time Line Project Mgr. .... 269.00

**FISCHER INNIS**  
 Watchdog Security Program ..... 239.95  
 Requires hard drive

**FUNK SOFTWARE**  
 Sideways ..... 44.95

**HARVARD SOFTWARE**  
 Harvard Project Manager ..... 209.95  
 New! Total Project Manager ..... 259.95

**IMI**  
 PC Paintbrush ..... 59.95

**INFOCOM**  
 Cornerstone ..... 279.95

**INNOVATIVE SOFTWARE**  
 Smart Software System ..... 495.00

**KENSINGTON/WESTERN UNION**  
 Instant Mail Manager ..... 59.95

**KOALA**  
 Executive Presentation ..... 99.95

**LIFE TREE**  
 Volkswriter Deluxe ..... 159.95

**LIVING VIDEOTEXT**  
 Think Tank (req. 256K) ..... 109.95

**MECA**  
 Managing Your Money ..... 99.95  
 Jim Fixx Running Program ..... 44.95

**MENLO PARK**  
 In Search ..... 339.95

**MICRO DATA BASE SYSTEMS**  
 Knowledge Man 1.7 ..... 239.95

**MICRO PRO**  
 Wordstar Pro Pack ..... 239.95  
 Wordstar 2000 ..... 239.95

**MICROIM**  
 R Base 5000 ..... 339.95  
 New! Clout 2.0 ..... 139.95

**MICROSOFT**  
 Chart ..... 154.95  
 New! Flight Simulator ..... 34.95  
 Multiplan ..... 119.95  
 Word 2.0 ..... 234.95  
 Project ..... 154.95  
 ACCESS ..... Call

**MICROSTUF**  
 Crosstalk XVI ..... 99.95  
 Remote ..... 109.95

**MONOGRAM**  
 Dollars and Sense w/floccast 99.95

**MULTIMATE**  
 Multimate Version 3.3 ..... 229.95  
 Multimate Advantage ..... 295.00

**PETER NORTON**  
 Norton Utilities 3.0 ..... 49.95

**POWER BASE SYSTEMS**  
 Power Base 2.1 ..... Call

**PROGRAMMER'S CORNER**  
 Lattice-C Compiler ..... 299.95  
 P-Fix 86 Plus Debugger ..... 299.95  
 C-Food Smorgasboard ..... 109.95  
 Morgan Prot. Basic ..... 79.95  
 Lattice Windows ..... 219.95  
 Trace 86 ..... 99.95  
 Panel for Lattice-C ..... 219.95  
 P-Mate Text Editor ..... 159.95

B-Trieve ..... 195.50  
 Plink-86 Overlay Linker ..... 299.95  
 X-Trieve ..... 169.95  
 Mark Williams C ..... 395.00

**QUATERDECK**  
 Desq ..... 139.95

**ROSESOFT**  
 Prokey 3.0 ..... 84.95

**SIMON & SCHUSTER**  
 Typing Tutor III ..... 34.95

**SORCIM**  
 Supercalc 3 Release 2 ..... 189.95  
 Super Project ..... 189.00

**SOFTWARE PUBLISHING**  
 PFS FILE ..... 84.95  
 PFS Graph ..... 84.95  
 PFS Report 79.95  
 PFS Write ..... 84.95

**SSI**  
 Word Perfect Vers. 4.0 ..... 219.95

**STARBRIDGE TECHNOLOGY**  
 Starbridge DOS ..... 39.95

**THE SOFTWARE GROUP**  
 Enable Vers. 1.1 ..... 319.95

**VM COMPUTING**  
 Relay Communication ..... 99.50

**WARNER SOFTWARE**  
 Desk Organizer ..... 59.95

**GRAPHIC SOFTWARE**  
 BRIGHTBILL ROBERTS  
 Gratix Partner ..... 84.95

**DECISION RESOURCES**  
 ChartMaster ..... 239.00  
 SignMaster ..... 179.00

**ENERTRONICS**  
 Energraphics ..... 229.95  
 Plotter Option ..... 65.00

## IBM PCjr. CORNER

- MICROSOFT PCjr. Booster**  
 128K RAM Mouse and Flight Simulator ..... \$139\*\*  
**KOALA** Koala Pad Touch Tablet for PCjr. with software ..... \$34\*\*  
**ALPHA** Electric Desk PCjr. .... \$129\*\*  
**MICRO PRO** WordStar for PCjr. .... \$99\*\*  
**TECMAR** PCjr. Captain 128K w/Parallel Port ..... \$129\*\*

**47st. Computer**  
 Computers and Business Equipment

67 W. 47th St. • 115 W. 45th St.  
 NYC CA LIC. # 800189 / 691860 NYC CA LIC. # 800191

**116 Nassau St.** Near City Hall and the World Trade Center  
 Computer Annex around the corner, 39 Ann Street

Mail Order Address: 36 E. 19th St., New York, N.Y. 10003

IN NEW YORK **1-212-260-4410**  
 STATE CALL  
 TOLL-FREE **1-800-221-7774**  
 OUT-OF-STATE

NASSAU STREET STORE 45th and 47th ST. STORES  
**1-212-608-6934 1-212-398-1410**

Store Hours: Sunday 10-4, Mon. thru Thurs. 9-6, Friday 9-2

- No surcharge for credit cards
- Prompt and efficient service
- Knowledgeable and experienced sales staff.

We accept MC, Visa, American Express & personal checks (no delays if approved). Minimum shipping and handling \$5.95. Software found to be defective will be replaced immediately. Defective hardware will be repaired or replaced at our discretion within the warranty period of manufacturer. Defective items must be sent to 36 East 19th Street, New York, N.Y. 10003. All Service Dept. Prices herein are for mail and phone orders only. Store prices may differ. Some items are subject to availability. Due to manufacturers price fluctuations, the prices may change beyond our control. This ad supersedes all previous PC ads. Not responsible for typographical errors.

Keep in touch with the latest items on the market and our up-to-date sale prices by checking our weekly ads in the National editions of the N.Y. Times and Wall Street Journal.

IBM is a registered trademark of International Business Machines Corp.

PC Magazine Oct. 29, 1985 dated Aug. 27, 1985

CIRCLE 242 ON READER SERVICE CARD

# LAN *Power*

...FOR THE PRODUCTIVITY MINDED.

## MDBS III ABSOLUTE POWER

Add real power to your local area network with MDBS III LAN. These features will give you productivity like you've never had before—

- Recovery and transaction logging
- Active and passive locking of records (not just files)
- Formalized structure report writing
- Debugging for the application developer
- 27 host programming languages to call subroutines
- SQL query language
- Forms development tools
- Multiple data structure support—including relational, network and hierarchical
- Unsurpassed speed

The MDBS III LAN is unrivaled. Get its power today. Available for networks from Nestar Systems, Novell, 3Com, and IBM under PC DOS, and from 3Com for Texas Instruments.

## KNOWLEDGE man/2

Get everyone in your department in on the universal knowledge management system, KnowledgeMan/2.

From data management to spreadsheet to statistical analysis, KnowledgeMan/2 is ready. Share your resources, consolidate your applications, programs, utilities and data with the most advanced integration available. KnowledgeMan/2 LAN allows several users to share a data base and still protect data integrity.

Help your department become more efficient and productive. KnowledgeMan/2 generates the power—LAN distributes it.

KnowledgeMan/2 LAN versions are available for networks made by Novell, 3Com and IBM.

Get the power of LAN with MDBS III, KnowledgeMan/2 or both. MDBS III and KnowledgeMan/2 can even be used together, for phenomenal application development power.



Micro Data Base Systems, Inc. • P.O. Box 248 • Lafayette, IN 47902 • 317/463/2581 • Telex 209147 ISE UR

KnowledgeMan/2, MDBS III, mdb's and these respective logos are registered trademarks of Micro Data Base Systems, Inc. Man is a registered trademark of Man Corp. IBM and PC-DOS are trademarks of International Business Machines. MDBS of Microsoft, Novell of Novell, Inc. ©1982, Micro Data Base Systems, Inc.



# PC Tutor

PC Tutor answers queries on everything from operating systems to applications to hardware.

## CHKDSK Deception

**Q.** I've got a puzzling problem with my hard disk. When I run CHKDSK /V, I find certain files listed in directories in which I know they don't belong. For instance, one of my batch files that is listed in the root directory when I use the DIR command, is listed by CHKDSK /V in the subdirectory I created for my word processor!

Is my directory somehow getting scrambled? I haven't noticed any performance problems—yet—but I wonder if I may lose data someday.

Tad Sendzimir  
Woodbury, Connecticut

**A.** The /V parameter for CHKDSK lists all directories and files on the disk. The file names are displayed indented. They are usually—but not always—listed under the directory where they are located.

If you take a closer look at the /V listing from CHKDSK, I think you'll find that the problem results from the confusing and downright deceptive manner in which CHKDSK lists directories and files rather than from troubles on your hard disk. To illustrate this, start with a formatted blank disk in drive A: and run the following four commands:

```
COPY CHKDSK.COM A:
MD A:\SUBDIR
COPY TREE.COM A:\SUBDIR
COPY BACKUP.COM A:
```

Now do a CHKDSK A:/V command. You'll probably see the listing that is shown below:

```
Directory A:\
  A:\CHKDSK.COM
Directory A:\SUBDIR
  A:\SUBDIR\TREE.COM
  A:\BACKUP.COM
```

It certainly looks as if BACKUP.COM is in the SUBDIR directory, doesn't it? But

look closer. The files are listed with the full path name. Thus, A:\BACKUP.COM means that BACKUP.COM is in the root directory, which is absolutely correct. CHKDSK lists the files and directories in the order that it finds them in the directory. Since SUBDIR is the second entry of the root directory, CHKDSK lists all files in the SUBDIR directory and then comes back to finish listing the files of the root directory.

Whenever you do a DIR command and see files listed below directory entries, be aware that CHKDSK /V will list those files after it lists the files in the directory.

On a disk where a lot of deletion and creation of directories and files has taken place, the CHKDSK listing may be almost unreadable. Use the TREE command instead for seeing which files are in which directories.

## Come Out of Hiding

**Q.** What have I done wrong? I installed my copy of Microsoft Word onto my hard disk along with a few too many other software packages. I ran out of disk space, so I simply removed Word and all its files and decided to use the distribution floppy on one of my other computers. But I can't remove Word's subdirectory \MSTOOLS. I was told to reformat my disk, but do you have any better ideas?

Chris Klardie  
Manchester, New Hampshire

**A.** You haven't done anything wrong, but software manufacturers should take note. I've received several questions about problems similar to this one, and they almost always result from some kind of copy-protection scheme.

Copy-protected software that can be installed on a hard disk often creates "hidden" files. These files do not show up in a DIR listing, so they cannot be deleted with

## SIGMA DESIGNS

color  
**400**



**BEST PRICE! \$495**

The best color graphics card on the market today! Enjoy a 640x400 non-interlaced display, 16 vibrant colors, monochrome quality text and automatic double resolution on standard 200 line software. Package includes Paintbrush 400.

**COLOR 400 W/SR-12..... \$1050**

**COLOR 400 W/TAX 440... \$1050**

**PC MOUSE..... \$110**

## IMAGE-PLUS NEW! \$549

### 10 MB TAPE BACKUP

This low power internal tape unit runs off your floppy controller. Fully DOS compatible & accessible like a floppy. Includes drive, 2 tape reels, software & manual.

## RAM-PLUS NEW! \$145

Creative Micro's new multifunction board comes with a par, ser, clk, cal, up to 384K, RAM disk & spooler.

**RAM-PLUS w/384K..... \$199**

## Creative Advantage

### 5 MB REMOVABLE

**HARD DISK \$895**

Ideal for storage & backup! Includes drive, cartridge, controller, cables & manual. (Additional cartridges \$85)

## Creative Edge

### 20 MB HARD DISK \$695

Boot DOS 2.0-3.1 directly from your hard disk. Includes drive, controller, cables, & manual.

HARD DISK	INT.	*EXT.
5Mb Removable	895	1045
10Mb Half-hgt	569	745
20Mb Half-hgt	695	845
20Mb Full-hgt**	995	1045
30Mb Full-hgt**	1495	1645

\* Externally mounted with fan and power supply  
\*\* Includes ext power supply

## SIGMA DESIGNS \$695

### EXPANSION CHASSIS

The #1 exp. chassis! Includes 100W power supply, 9 card slots, 2 drive slots, 2 interface cards & cable.

**MINI EXP. CHASSIS..... \$595**

**45MB TAPE BACK-UP..... \$995**

**HAYES 1200 Modem..... \$399**

**HAYES 1200B Modem..... \$365**

## Creative Micro

(415) 945-1201 (800) 321-3324

3339 Vincent Rd.,  
Pleasant Hill, CA 94523



**ORDER TOLL FREE  
24 HOURS EVERY DAY  
800-662-2686**

**SPECIALS**

Rbase 5000	359
Multimate	219
Pop-Up Deskset w/Telecomm	79
Energygraphics w/Plot Option	235
IsaBba P351	1169
Epson DX-10 Daisywheel Printer	229
Novation Pro 2400	529
Tecmar Captain w/384k	439
Amdek Color 700	239
Everex 20 MB Internal HD	589
Datashed 300 watt Backup Power	359

**ACCOUNTING & FINANCIAL**

Real World Accounting (per module)	389
Open for Business I	409
CPA - Accounting System	429
Steps to Success Plus (per module)	135
Star Accounting Partner 2	179
One Write Plus	109
Managing Your Money	109

**DATABASE**

Glase III	369	Reflex	299
PIS File Report Combo	149	Cornerstone	279
Base Manager I	279	Clad 2.0	119

**SPREADSHEETS & INTEGRATED SOFTWARE**

Lotus 1-2-3	299	Symphony	415
Ability	299	Framework	369
Spreadsheet Auditor	65	Excel	345

**WORD PROCESSING**

Microsoft Word ver 2.0	219	Word Perfect	225
Volunteer Desktop	149	Demux II	359
Peached 5000	149	Therionix	99

**GRAPHICS/UTILITIES/LANGUAGES**

Charmaster	229	Sigmastar	159
Microsoft Chart	149	Energygraphics	179
Graphmaster Combo	359	Execucom	239
Autocad w/A.D.E.	1249	Gem Draw	89
Norton Utilities	49	Fontits	95
Control	99	Remate	105
Spotlight	49	Gem Collection	119
Macro Assembler	95	Deag	125
Microsoft Pascal	179	MS Fortran	215
DB Assistant Plus Tools	119	Pascal Mfr	239
True Basic	95	Clipper	419

**MODEMS & EXPANSION BOARDS**

Smartmodem 2400	599	Smartmodem 1200	349
Intermodem II	309	SmartCall	299
Quadruplex Exp. 384k	279	SmartLink 384k	399
Orchard Isocan 384k	299	Advantage	409
Alkam 2 GK-246	169	STB Choulier	299
Paradise Multiplexer	199	Genex Spectrum	309

**PRINTERS & MONITORS**

Epson LX-80	319	Epson FX-85	339
Epson iQ-1500 Parallel	999	Epson DX-20	339
Fontmaster 3450	549	Epson FX-185	485
Fontmaster (cpi)	549	Remate II (cpi)	485
NEC 2050	639	NEC 3350	999
Amdek Color 300 (cpi) 320/384		Amdek Video 300	349

**Call Toll Free 24 hrs Every Day  
800-662-2686 orders only**

for Ca. Orders, Tech Support, Price Quotes, Info

415-668-9350 9-5 pacific time, m-f

Call or Write for Free Catalog

WARNING: Vias, Mother Card, Contain's Checks, Revised Checks with 3 yrs. warranty. 123 No fee to credit cards. CA residents add sales tax.  
SHIPPING: JF ground 75 per case. 1st rate 18% to 50 per case over 25000.  
JF Ins. 75 per case 30 min. 18% to 50 per case over 25000. Resale, Monitor & Fax Order 15% add.  
All Products New with full warranties.  
Prices & availability subject to change without notice.

**THE BAY**



THE BEST PRICES THE BEST SERVICE

**COMPANY**

584 CASTRO ST., SUITE 487, SAN FRANCISCO, CA 94104  
a division of MCIS, Inc./Computer & Software specialists since 1981

CIRCLE 107 ON READER SERVICE CARD

**PC TUTOR**

the DEL command, but they prevent RMDIR from removing the directory. You can see these files by running CHKDSK with the /V parameter. Word's installation program creates four hidden files in a sub-directory named \MSTOOLS. These are MW.COM, MW.COD, MW.DAT, and MWA.

Figure 1 shows how you can use DEBUG to create a program called REVEAL.COM that will turn hidden files into normal files. You can then delete them. Since I've tried to make this program as short as possible, it's not very flexible. When running REVEAL, one and only one space must separate the word REVEAL from the filename (with optional drive and path indicators), thus:

REVEAL C:\MSTOOLS\MW.COM

The program does not report errors—if you see the file when you do a DIR listing, you simply know the program worked. (The Norton Utilities include more-sophisticated programs to change file attributes.)

So, to summarize: run CHKDSK /V to see the hidden files; use REVEAL to change them to normal files; get rid of them with DEL; and finally remove the subdirectory with RMDIR.

You must use this technique with caution for other copy-protected programs. Since some such programs cannot be installed on a hard disk a second time, you should be absolutely sure that removing the hidden files from your hard disk is really what you want.

To date, I've only seen one such software package that includes a straightforward way to uninstall it from the hard disk. Evidently other software manufacturers never dream that hard disk owners may someday want to remove the programs from their systems.

**PCjr Video Mismatch**

Q. I thoroughly enjoyed Bill Machrone's article on the PCjr (From the Editor's Screen, Volume 4 Number 12), as I am the owner of one of these discontinued jewels. But I have a few questions about the programs PC Magazine runs that use the screen display. Is the PCjr video memory so much different that these programs will not run on my machine?

So far I've tried the BORDER.COM and SCR.COM routines printed in this column (Volume 4 Number 9), and COLOR.COM (Volume 4 Number 14), but none of these programs have any effect on the

**C>DEBUG**

-A 100

XXXX:0100 MOV SI,0000

; POINTS TO PARAMETER

XXXX:0103 MOV BL,[SI]

; NUMBER OF CHARS

XXXX:0105 SUB BH,BH

; ZERO OUT TOP BYTE

XXXX:0107 MOV BP,[SI+BX+1],0

; MAKE ASCII STRING

XXXX:010C MOV DX,0002

; BEG. OF ASCII

XXXX:010F MOV CX,0000

; NORMAL FILE

XXXX:0112 MOV AL,01

; CHANGE INDICATOR

XXXX:0114 MOV AH,43

; CHANGE MODE CALL

XXXX:0116 INT 21

; CALL DOS TO DO IT

XXXX:0118 INT 20

; TERMINATE

XXXX:011A

; BLANK LINE

-N REVEAL.COM

-R CX

CX 0000

:001A

-W

Writing 001A bytes

-Q

Figure 1. Use DEBUG to make REVEAL.COM, which changes hidden files to normal files. The comments following the semicolons do not have to be typed and are ignored by DEBUG. The numbers represented by XXXX vary with machine.

# DISK WORLD! is proud to introduce the lowest-priced, LIFETIME-WARRANTY diskettes ever!

## And they're BRAND NAME PRODUCTS to boot!

**5.25" SSDD → .69 ea. 5.25" DSDD → .79 ea.**  
**5.25" DSDD-HD → \$2.25 ea.**  
**3.50" SSDD → \$2.09 ea. 3.50" DSDD → \$2.55 ea.**

Based on multiples of 100 each.  
 Based in 10's with heavy-duty cardboard sleeves, user ID labels,  
 reinforced hubs (where appropriate) and write-protect tabs.

### Introducing Wabash Pinnacle Series Diskettes.

Two years ago, if you'd told me I'd be writing this ad, I would have laughed.  
 At that time, Wabash diskettes were synonymous with "s-l-r".

Just saying that quality control was poor would be charitable.  
 So much was wrong that DISK WORLD! sell them.

### That was yesterday.

Kearney-National Inc., a \$202-million division of a much larger company, came into Wabash.  
 Out went the old management, the old methods, the old production techniques... and in went a lot of new people, ideas, production lines and some really imaginative thinking.

### The end result.

Today, I'm proud to offer you the Wabash Pinnacle Series of diskettes at the prices shown.  
 This isn't evolution in diskette manufacturing; it's revolution.

### Here's what you get.

Wabash Pinnacle diskettes are:  
 - certified 100% Error Free  
 - are covered by a LIFETIME WARRANTY  
 - meet or exceed all industry specifications (by quite some distance)  
 - and are simply the best value in diskettes available today.

### The torture test.

Considering Wabash's earlier dubious reputation, I wasn't exactly a true believer when their Director of Marketing came into my office with samples.

So I took a box at random, selected a disk, bent the thing every which way and slipped it into my IBM PC.  
 It formatted. It booted. It stored and retrieved data.

### That wasn't enough.

I gave samples of the diskettes to Curt Rostenbach and, in turn, to Tom Street, both hackers of long experience and members of the Wauegan (Illinois) Apple Users Group.  
 Tom really went at it.

He took a quartz-halogen lamp, aimed it at the diskette until it started to smoke (and melt), and then formatted, booted the diskette and stored and retrieved data!  
 The same torture (and eventually mutilated) diskette ran on an ITT Corona IBM.

Curt was next.  
 He simply bent the diskette every which way... and it still formatted, booted and ran on his Apple.

### The best buy I've ever seen.

DISK WORLD! Inc. sells more flexible magnetic media by mail-order than anyone else in the world.  
 I, as President of the corporation, won't tolerate a product with a failure rate of more than 1/1000th of 1 percent.  
 I also don't like companies who try to make a "quality" or "premium" image for a higher price like Dysan and Verbatim did... until they failed.

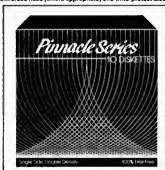
As President of DISK WORLD! Inc., my motto is simple: "The best diskette for the least amount of money."

### Wabash is it.

Right now, there is no better value than the Wabash Pinnacle Series of diskettes.

Granted, you have to buy a hundred at a time, but so what? Split the order with friends, relatives, co-workers or even your worst enemies.

The way thing is to get the most diskette for the money. And this is it.  
 (Incidentally, as a corporation, we put our money where our



mouth is. Our first order for Wabash Pinnacle Diskettes was 15 million units.)

That's an awful lot of faith and confidence.  
 But, there again, I have the diskette that Tom Street literally melted... and kept on running.

### The truth about \$1.00 or less diskettes.

More and more ads are popping up offering diskettes for \$1.00 or less.

By the same token, more and more people who were selling used cars a few months ago are now selling diskettes by mail.

We did a little survey of current ads for diskettes advertised for a dollar or less and did some analysis of the market and here's what we found as it applies to 5.25" DSDD diskettes "supposedly" selling for a dollar or less:

VENDOR:	ADVERTISED LOW PRICE:	ACTUAL PRICE PER 100:	ACTUAL INFO:
Unitech	89 ea	92 ea	Unspecified
Dataseek	99 ea	99 ea	Unspecified
Computer Club	99 ea	98 ea	Unspecified
	99 ea	102 ea	Unspecified
Communications & Electronics	49 ea	80 ea	Unspecified
Precision Data	69 ea	93 ea	Unspecified
Diskette Connec	93 ea	93 ea	Unspecified
Comp Soft Serv.	77 ea	77 ea	Unspecified
			+ when
Computer/Computer	99 ea	99 ea	Unspecified
DISK WORLD	89 ea	92 ea	Wabash Diskette

### The real truth about \$1.00 or less diskettes.

It costs all diskette manufacturers the same to produce a diskette. Some may charge more because they want to project a "premium quality" image, ala the late lamented Dysan who bought their basic media from 3M.  
 Some charge less because they sell a sub-standard product... and we're not foolish enough to name names here.  
 But here's the truth about the \$1.00 or less diskette market: it falls into two categories.

1. The DISK WORLD! of the universe who simply are so big that they can buy first quality product in massive quantities and choose to pass on the savings to you. (Precision Data and Diskette Connection on BRAND NAME products also fall into this category.)

2. The people who buy "cosmos" stuff from major manufacturers. They usually have quality control standards, but is cosmetically blemished and thus can't be packaged and sold under the manufacturer's own name.

3. "Duplicator Quality" Uncertified media, usually below manufacturer's own standards and frequently below ANSI and IBM standards. Sold on an "as-is" basis with the understanding that the manufacturer's name will never be divulged. Usually about a 20% reject rate, as compared to DISK WORLD! standard of less than 1/1000th of 1% reject/return rate. Next to garbage, this is the source of most diskettes advertised at a dollar or less.

They may work, and then again they may not. (Frankly, the odds at the Blackjack table in Las Vegas are more in your favor.)

4. Garbage. Stuff that shouldn't be sold at all. But some manufacturers are hurting for cash, so they sell it anyway. (After all, they want to meet their payroll. Look what happens when you don't: you become a Dysan or Verbatim. Lots of history, but no money.) More and more garbage is being dumped into the market as manufacturers become pressed for cash and are motivated into selling anything and everything they can manufacture. (Read the article in FORBES about Verbatim and its "Bonus" brand.)

Finally, the Taiwanese counterfeiters are moving into the act. Perfect duplicates of the packaging of major manufacturers with one exception: the quality isn't there.

### The Critical Factor.

Only DISK WORLD! Inc. offers fully brand-identified, LIFETIME-WARRANTY product for less than a dollar.

Every one else offering a 5.25" product for less than a buck doesn't tell you who makes it.

We do.

And that ought to tell you a lot more than

## Ordering & Shipping Instructions

**SHIPPING:** Wabash Pinnacle Diskettes are sold in multiples of 100 only. Delivery charges are \$3.00 per 100, regardless of type or size.

**PAYMENT:** VISA, MASTERCARD and PREPAID orders accepted. Corporations rates 342 or better and government and quasi-government open accounts are accepted on a NET 15 basis.

C.O.D. orders are subject to a \$5.00 special handling charge. (Sorry for the increase, but too many people have been relying on C.O.D. orders or using bad checks. It's a classic example of a few "bad eggs" making life more expensive for everyone else.)

**APO, FPO, AK, HI & PW ORDERS:** include shipping as shown and an additional 5% of the total amount of the order to cover P&H and insurance.

No other non-continental U.S. orders are accepted.

**TAXES:** Illinois residents only, add 7%.

MINIMUM ORDER \$35.00

All orders subject to acceptance.

Not responsible for typographical errors.

### ORDERS ONLY:

1-800-421-6822

(In Illinois: 1-312-256-7140)

### INQUIRIES & INFORMATION

1-312-256-7140

### FOR FASTEST SERVICE, USE MCI MAIL:

Just address "DISKORDER"

(24-hour shipping on any item in stock

if you order via MCI MAIL.)

# DISK WORLD!, Inc.

629 Green Bay Road  
 Wilmette, Illinois 60091



# CopyWrite

## BACKS UP IBM PC SOFTWARE

Hundreds of the most popular copy-protected programs are copied readily. CopyWrite needs no complicated parameters. It needs an IBM Personal Computer, or an XT or an AT, 128k bytes of memory, and one diskette drive. CopyWrite will run faster with more memory or another drive.

CopyWrite is revised monthly to keep up with the latest in copy-protection. You may get a new edition at any time for a \$15 trade in fee.

CopyWrite makes back up copies to protect you against accidental loss of your software. It is not for producing copies for sale or trade, or for any other use that deprives the author of payment for his work.

To order CopyWrite, send a check for \$50 U.S., or call us with your credit card. We will ship the software within a day.



Quaid Software Limited

45 Charles Street East  
Third Floor  
Toronto, Ontario M4Y 1S2  
(416) 961-8243

Ask about ZeroDisk to run copy-protected software from a hard disk without floppies.

## PC TUTOR

border color. I know it can be done, as I have other purchased programs that change border and screen colors together.

I hope, as Mr. Machrone suggested in his article, that columns with programs such as these will try, if possible, to be compatible with the PCjr and will advise if the programs are not. Magazines such as yours are the only hope for PCjr owners in remote areas away from big cities and user groups.

B. Carroll Knight  
Greeneville, Tennessee

A. IBM went to some lengths to make the substantially different video display of the PCjr very nearly compatible with the other PC models. Of the three programs you mention, BORDER.COM is the only one that will specifically change border colors on the other PC models, and, as you noted, it will not work on a PCjr. As the IBM PCjr Technical Reference manual states (p. 4-16): "The IBM PCjr and IBM Personal Computers utilize the 6845 [video] controller, but the hardware interface is not completely the same. Hardware addresses hex 3D8 and hex 3D9 are not supported by the IBM PCjr video interface. Requests using these two addresses are not honored."

If you look at the BORDER.COM program that won't work on the PCjr, you'll

see it uses the not-honored I/O port 3D9. It really wouldn't have to, however, since a BIOS interrupt is available for setting the border color. A new improved BORDER.COM shown in Figure 2 uses this BIOS interrupt to set the border color and should work on all (and dare I suggest future?) members of the PC family.

Another advantage of this new BORDER.COM is that it takes a parameter for the border color. For instance,

### BORDER A

will set a blue border. You can try letters from B through P (either upper or lower case) for the other 15 border colors.

Being geographically remote from big cities and user groups doesn't mean you have to be far away from information. With the addition of a modem and some communications software on your PCjr, you can access bulletin boards and make contact with special-interest groups (SIGs), that can provide more free software and user tips than you'll have time to use. And most programs you download from PC-IRS will run on the PCjr.

The PC Tutor solves practical problems and explains points of general interest. To see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016. ■

### DEBUG

```
-A
XXXX:0100 SUB BH,BH      ; COLOR ID = 0
XXXX:0102 MOV BL,[5D]    ; GET COLOR FROM FCB
XXXX:0106 AND BL,0F      ; KEEP LOW 4 BITS
XXXX:0109 MOV AH,0B      ; PALETTE CALL
XXXX:010B INT 10         ; CALL BIOS
XXXX:010D INT 20         ; EXIT
XXXX:010F                ; BLANK LINE
-N BORDER.COM
-R CX
CX 0000
:000F
-W
Writing 000F bytes
-Q
```

Figure 2. A new, improved BORDER.COM that will work on the PCjr and accepts a letter parameter to set different border colors.

# Now, more convenient... 4 (exclusive) ways.

Now, the mbp COBOL Compiler offers unrivaled convenience to go with its unmatched performance.

Here are the convenience features you've wished for:

1) an enhanced Screen Management System with program-controlled video attributes and color; 2) support for PATH & sub-directories; 3) DOS command execution from within a COBOL program; 4) 'permanent' DEFAULT modification.

The new mbp Compiler has them all! And they're exclusives: you get them *only* with mbp.

## GIBSON MDX Benchmark Results

Calculated S-Profile  
(Representative COBOL statement mix)

### Execution time ratio

mbp* COBOL	Level II* COBOL	R-M* COBOL	Microsoft* COBOL
1.00	4.08	5.98	6.18

\*IBM system with hard disk required IBM PC & AT are IBM TRS. Software is a Novell file. TM Level II is a Micro Focus TM. R-M is a Royal Macintosh TM. Microsoft is a Microsoft TM.

Plus, it's 4 times faster.

Because the mbp COBOL Compiler generates native machine language object code, it executes programs at least 4 times faster (see chart). Now, we've made that performance even more convenient to use.

## The complete COBOL.

An Interactive Symbolic Debug Package included standard; Multi-keyed ISAM structure; SORT & CHAIN; GSA certification to ANSI '74 Level II; IBM/PC-AT and TI Professional compatibility; with mbp, you get it all. Optional: IBM-PC Network and Novell interfaces.

**mbp COBOL: the choice of professionals.**

It's no surprise more and more companies like Bechtel, Bank of America, Chase, Citicorp, Connecticut Mutual, Hughes Aircraft, McDonnell-Douglass, and Price-Waterhouse choose mbp COBOL.

*Make it your choice, too.*  
Just send the coupon, or call, for complete information.  
Today.

Visit us at COMDEX, Booth 4658

**mbp COBOL.**  
**\$1000**

Please send complete  
mbp COBOL information to:

NAME

COMPANY

ADDRESS

CITY/STATE/ZIP

PHONE

mbp Software & Systems Technology, Inc.  
1151 Harbor Bay Parkway, Suite 260  
Alameda, CA 94501

Phone 415/769-5333

**mbp**

Incredible value!

# Nashua Diskettes

**LIFETIME WARRANTY!**

**85¢ ea.** 5 1/4" SSDD **97¢ ea.** 5 1/4" DSDD

These are poly bagged diskettes packaged with Tyvek sleeves reinforced hubs, user identification labels and write protect tabs. Nashua Corporation is a full service data corporation and a recognized leader in magnetic media.

**SOFT SECTOR ONLY!** Sold in multiples of 50 only

**FOR ORDERS ONLY:** 1-800-621-6827 **INFORMATION & INQUIRIES:** 1-312-256-7140

**HOURS:** 8AM-5PM Central Time Monday-Friday

**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!**

**DISK WORLD!, Inc.**  
629 Green Bay Road • Winnetka, Illinois 60091

**DISK WORLD!** Authorized Distributor **NASHUA MAGNETIC MEDIA**

## ATHANA DISKETTES

The great unknown!

**79¢ ea.** 5 1/4" SSDD **85¢ ea.** 5 1/4" DSDD

You've used these diskettes hundreds of times...as copy-protected originals...as some of the most popular software packages. They're packed in poly-bags with 25 with Tyvek sleeves, reinforced hubs, user identification labels and write-protect tabs.

**LIFETIME WARRANTY!**

**SOFT SECTOR ONLY!** Sold in multiples of 50 only.

**FOR ORDERS ONLY:** 1-800-621-6827 **INFORMATION & INQUIRIES:** 1-312-256-7140

**HOURS:** 8AM-5PM Central Time Monday-Friday

**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!**

**DISK WORLD!, Inc.**  
629 Green Bay Road • Winnetka, Illinois 60091

**DISK WORLD!** Authorized Distributor **ATHANA MAGNETIC MEDIA**

## DISKETTE STORAGE CASES

**AMARAT MEDIA-MATE 50: A REVOLUTION IN DISKETTE STORAGE**

Every once in a while, someone invents the simple and makes it elegant! This unit holds 50 5 1/4" diskettes, has grooves for easy stacking, inside supports to keep diskettes from slipping and several other features. We like it!

**\$9.69 ea.** Shipping

**DISKETTE 70 STORAGE: STILL A GREAT BUY.** Just free storage for 70 5 1/4" diskettes. Six dividers included. An excellent value.

**\$9.95 ea.** Shipping

The original flip-up holder for 10 5 1/4" diskettes. Beige or grey only.

**\$1.65 ea.** Shipping

**FOR ORDERS ONLY:** 1-800-621-6827 **INFORMATION & INQUIRIES:** 1-312-256-7140

**HOURS:** 8AM-5PM Central Time Monday-Friday

**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!**

**DISK WORLD!, Inc.**  
629 Green Bay Road • Winnetka, Illinois 60091

**DISK WORLD!** The value leader in Computer supplies And accessories.

FANTASTIC LOW PRICES ON

# BASF QUALIMETRIC DISKETTES!

**LIFETIME WARRANTY!**

Buy in bulk and save...100 to the carton with envelopes write protect tabs and user ID labels. Boxed product is the same, except in cardboard boxes of 10.

5.25" SSDD	83 ea.	Qty 50	80 ea.
5.25" DSDD	94 ea.	Qty 50	92 ea.
5.25" DSDD HD	2 1/2 ea.	Qty 50	N/A
5.25" SSDD 96TPI	34 ea.	Qty 50	N/A
5.25" DSDD 96TPI	1 06 ea.	Qty 50	N/A
5.25" SSDD 135TPI	1 84 ea.	Qty 50	1 88 ea.
5.25" DSDD 135TPI	2 40 ea.	Qty 50	2 28 ea.

**NOTE:** 3 50" diskettes in Quantity 50 are packed in plastic library cases. That's why they seem to be a better buy. But there are only 5 diskettes to a case...so the bulk diskettes are really a better deal...unless you like expensive little library cases.

**FOR ORDERS ONLY:** 1-800-621-6827 **INFORMATION & INQUIRIES:** 1-312-256-7140

**HOURS:** 8AM-5PM Central Time Monday-Friday

**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!**

**DISK WORLD!** Authorized Reseller **Information Processing : BASF Media**

## DISK WORLD!

Ordering & Shipping Instructions

**Shipping:** 5 1/4" & 3 1/2" DISKETTES—Add \$3.00 per each 100 or fewer diskettes. **Other items:** Add shipping charges as shown in addition to other shipping charges. **Payment:** VISA and MASTER CARD accepted. **COD Orders:** Add additional \$5.00 special handling charge. **APD, FPO, AK, MI & PR Orders:** Include shipping charges as shown and additional 5% of total order amount to cover P&H and insurance. **Terms:** Illinois residents add 7% sales tax.

**Prices subject to change without notice.** This ad supersedes all other ads. Not responsible for typographical errors. **MINIMUM ORDER:** \$35.00

**FOR ORDERS ONLY:** 1-800-621-6827 **INFORMATION & INQUIRIES:** 1-312-256-7140

**HOURS:** 8AM-5PM Central Time Monday-Friday

**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!**

**DISK WORLD!, Inc.**  
629 Green Bay Road • Winnetka, Illinois 60091

**DISK WORLD!**

## PRINTER RIBBONS:

at extraordinary prices!

Brand new ribbons manufactured to Original Equipment Manufacturer's specifications, in housings. (Not re-wired or re-stocks only.)

**LIFETIME WARRANTY!**

**Epson MX-70/80 . . . \$2.70 ea. + 25¢ Shipping.**  
**Epson MX-100 . . . \$4.08 ea. + 25¢ Shipping.**  
**Okidata Micro83 . . . \$1.37 ea. + 25¢ Shipping.**  
**Okidata Micro84 . . . \$2.98 ea. + 25¢ Shipping.**

**FOR ORDERS ONLY:** 1-800-621-6827 **INFORMATION & INQUIRIES:** 1-312-256-7140

**HOURS:** 8AM-5PM Central Time Monday-Friday

**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!**

**DISK WORLD!, Inc.**  
629 Green Bay Road • Winnetka, Illinois 60091

**DISK WORLD!**

Now, the lowest prices ever on

# 3M Scotch® DISKETTES

**LIFETIME WARRANTY!**

The best deal on 3M diskettes you've ever seen! **FREE!** FLIP 'N FILE 15 with every order for 5.25" SSDD and DSDD.



**\$1.36 ea.** 5.25" SSDD with FREE Flip 'N File 15  
**\$2.55" DSDD with FREE Flip 'N File 15 . . . \$1.67 ea.**  
**MINIMUM ORDER:** 50 Diskettes  
(Orders less than 50 are \$1.39 and \$1.70, respectively.)

**100% LIFETIME WARRANTY!**

This is a Super Special Promotion. It was supposed to end May 31, 1985.

But we decided to buy more than 1,000,000 3M diskettes packed in the FREE Flip 'N File 15...and give you the benefits of this terrific value.

One word of warning: this offer is limited only to supplies on hand. Once this inventory is gone, that's it. The prices stay the same...but there's no FREE Flip 'N File.

The last time we ran an offer like this, everybody sold out in about six weeks.

So don't wait. Order now.

Other 3M diskettes	Qty 20	Qty 50
5.25" SSDD-96TPI	\$2.07 ea.	\$2.04 ea.
5.25" DSDD-96TPI	\$2.51 ea.	\$2.48 ea.
5.25" DSDD-HD FOR AT	\$3.18 ea.	\$3.14 ea.
3.50" SSDD-135TPI (Mac)	\$2.29 ea.	\$2.26 ea.

## DATA CARTRIDGES

100% certified 3M data cartridges  
**0C-1000 . . . \$12.62 ea.**  
**0C-3000LP . . . \$19.38 ea.**  
**0C-600A . . . \$20.61 ea.**

Sold in cases of 10 only  
Add \$5.00 shipping per 10



## FIRST TOUCH KEYBOARD STRIP

The best way we've ever seen to avoid static danger. Adheres to the front edge of your keyboard. Overpriced at \$19.95, so we cut the price to \$10.95 + \$1.50 Shipping.



## A VERY SPECIAL OFFER

**3M POST-IT NOTES & DISPENSER**  
Suggested Retail \$20.95 includes dispenser, 12 pads of 3" x 5" Post-It notes and Pilot Ball Point Pen. Order it with 50 3M diskettes or 10 data cartridges and it's only \$9.75 + \$3.00 Shipping.

**DISK WORLD!** Authorized Distributor **Information Processing Products** **3M**

# PC Reviews in Brief

## Wishbringer: When You Wish Upon a Stone

BY JAMES LANGDELL

*Wishbringer* is simpler than most of Infocom's adventure games, which makes it a good introduction to interactive fiction games for children. As a story, though, this game is interesting enough to entertain—rather than embarrass—adults and seasoned adventurers.

At the start of *Wishbringer*'s adventure you are a humble mail clerk in Festercton, a small seaside village. Your first task is to deliver a mysterious special-delivery letter to the Olde Magic Shoppe. At first you might think you could find the right address simply by searching all the town's haunts, from the Pleasure Pier's game arcade through the spooky graveyard. Before you can win the game, however, you'll have seen every familiar thing in your hometown turn nasty, and your quest will change to rescuing playpuses and a very important black cat.

You're aided in your task by the magic of Wishbringer, a stone of dreams. As you travel underground and through the air, wise use of the stone may save you from death in a torture chamber or a monster's lair.

In its dramatic moments, the game has an atmosphere reminiscent of Susan Cooper's *The Dark Is Rising* novels—stories in which children vacationing on the English coast become participants in battles between mythical forces of good and evil. But on the whole, *Wishbringer* has a light touch that will inspire more laughter than fearful gasps. Its author, Bob Moriarty, claims he was inspired by Lewis Carroll. His Wonderland-style whimsy

comes out in scenes that involve the playpuses and a surprisingly affectionate mailbox. The culminating scene is set in a place that might have been fascinating to explore at length. You're thrust into action instantly, however.

The game is straightforward, so inexperienced adventurers are unlikely to be stuck forever at a dead end. Most problems can be solved by using either logic or magic. The redundant solutions not only prevent frustration while you try to win the first time but they make it worthwhile playing *Wishbringer* again simply to experience additional scenes that occur only when you try the other solutions.

Infocom's disk is copy-protected in a way that allows you to make one backup copy. *Wishbringer* comes in an elaborate

go west  
Twilight glim  
The trees here are so thick, it's almost too dark to see! You can make out an open iron gate to the north, and a narrow lane between the tombstones winds off to the east.

There must have been a burial here recently. Somebody left their umbrella leaning up against a tombstone.

The gravedigger is locking the iron gate from the outside as you approach. "Keep out of the cemetery after dark," he tells you with a sly wink.

You can hear his chuckling as he disappears to the north.

Take umbrella  
Taken.

go east  
Spooky Cope

Look  
Spooky Cope

A copse of willow trees makes this part of the cemetery look really spooky. Narrow lanes wander south and west.

There's an open grave nearby, freshly dug, with a tombstone erected next to it.

One of the many whimsical scenes in Infocom's interactive fiction game *Wishbringer*.

rate package that includes pieces of mail, a map of the village, the *Wishbringer* stone itself, and a well illustrated booklet that tells The Legend of *Wishbringer* without giving away the solution to the game. If you'd like a few hints—or a lot of help—you can send Infocom \$7.95 for a booklet of *Wishbringer* InvisiClues printed in invisible ink.

### Wishbringer

Infocom, Inc.  
125 Cambridge Park Dr.  
Cambridge, MA 02140  
List Price: \$39.95

Requires: 48K RAM, one disk drive, monochrome or color display.

Circle 642 on Reader Service Card

## Express Letter Processor: Simple Personalized Mail

BY VIRGINIA DUDEK

Preparing mailing lists is no small task, but the *Express Letter Processor* from Mirage Concepts is an adequate, though at times awkward, method for managing simple lists that don't require the ability to merge with outside word processing programs.

A built-in word processor is available for constructing letters. *Express* lets you insert names, addresses, and a conditional salutation based on fields in the mailing list program. A question mark followed by the number of the field automatically inserts names and addresses in the letter. Another feature lets you insert the first name of the recipient within the body of the

(Continued)

Available options from *Letter Express Processor*'s main menu screen.

# EZ-DOS: Turning DOS into a Nightmare

BY JAMES LANGDELL

If you're a novice PC user who has heard that DOS is difficult to use, a session with *EZ-DOS* would be enough to prove the stories true. Imagine an operating system that, instead of presenting you with a bare, cryptic command prompt like `A>`, gives you a menu from which to select commands—three pages of menus to sort through, in fact.

Say, for example, you want to display a directory of files on a disk in drive A:. With DOS, you'd have to remember to type `DIR A:`. With *EZ-DOS*, you simply track down the page with a line describing the action you want. Then you move the cursor there and press and return key. (First, though, you must realize that a highlighted cursor exists. It doesn't appear on-screen until you've hit one of the arrow keys.)

Now be prepared to answer questions about which options you want to use with that command. Be sure to remember your answers because the screen will give no evidence of your choices. After the last question, will the computer be ready to execute your command? Not yet. First it displays a cryptic line (like `DIR A: /W`) labeled *Your EZ-DOS Command*. The

computer then pauses to write that command line onto the *EZ-DOS* disk. It then reads the command back from where it was just stored in order to finally execute it.

Actually, *EZ-DOS* won't do any of the jobs on its menus unless you've first copied several DOS program files onto the *EZ-DOS* disk. The meager manual doesn't tell you which files you need to copy, however. Instead, you must run a separate setup routine that prepares the *EZ-DOS* disk.

One unfortunate side-effect of this installation process is that it automatically replaces your original `CONFIG.SYS` file with *EZ-DOS*'s own. That caused my hard disk to fail to reboot, as my original `CONFIG.SYS` file contained statements needed to initialize it.

If you feel puzzled in the midst of these operations, you might respond to the screen's suggestion to press H for help. Prepare to wait 55 seconds or so before the first page of explanation scrolls to the top of the screen, with each line—including the blank ones—accompanied by a grind of the disk drive. This explanation screen is usually followed by several more explaining the command in the same detail as IBM's DOS manual. If the explanation

particular name in the mailing list, *Express* will search through the cards, or listings, by the last name of the entry. Just hit Ctrl-F and enter the last name or part of the name.

Printing your work takes getting used to. For example, when doing a mail merge, you must go into the word processor, load the letter, exit to the main menu directly from the file, then go into the mailing list and load the desired list. Exit to the main menu again and call up the `PRINT` command.

A typewriter mode is included that gives the computer the same functions as a memory



*EZ-DOS*'s main menu replaces PC-DOS's prompt for accessing programs and commands.

seems to go on forever, that's because the computer has gone on to discuss other DOS commands in alphabetical order. Don't bother trying to get back to a page that passed by too quickly to be read.

At this point, there's no suggestion on the screen as to how to get back to performing the action you had asked for before all this helpful stuff put you to sleep. Instead, you have to remember to hit Ctrl-Break, answer the question "End Batch?" with a Y, then respond to the next prompt, "Your *EZ-DOS* Command," by typing in the letters `DOS`.

If you're lucky, the computer will eventually go back to doing what you asked it to—such as giving you a directory of file names. But if you did anything wrong, the screen will say, "We are sorry you did not end

*EZ-DOS* by pressing the End key. Restarting *EZ-DOS*." That puts you in an endless loop of frustration until you turn the computer off and start from scratch.

What a mess! Just imagine how much more unmanageable the PC's regular DOS would have been if *EZ-DOS* hadn't been helping you out.

## EZ-DOS

EZ-Software Co.

1901A Oak Creek Lane  
Bedford, TX 76022  
(817) 267-0089

List Price: \$99.95; trial version good for 10 sessions, \$10

Requires: 128K RAM, one disk drive, PC-DOS 2.x

Circle 643 on Reader Service Card

## EXPRESS LETTER PROCESSOR

(continued from previous page)

letter so that the letter can be personalized. The word processor can also merge two files.

The mailing list contains a default setting that automatically calls up the designated file when the mailing list program is used. Changing between files requires using Ctrl-W to write to or save the file and then Ctrl-N to clear the screen and start a new list. Ctrl-L loads an already saved file.

If you need to search for a

particular name in the mailing list, *Express* will search through the cards, or listings, by the last name of the entry. Just hit Ctrl-F and enter the last name or part of the name.

Printing your work takes getting used to. For example, when doing a mail merge, you must go into the word processor, load the letter, exit to the main menu directly from the file, then go into the mailing list and load the desired list. Exit to the main menu again and call up the `PRINT` command.

A typewriter mode is included that gives the computer the same functions as a memory

typewriter. With your printer on, *Express* will print out a line of type each time you hit the carriage return, exactly the same as a memory typewriter. It can also make use of printer functions such as italics and boldface.

However, aside from addressing an occasional envelope, the exact purpose of this feature is not clear. Its mandatory carriage return feature is clumsy to use and does not offer a wordwrap function so valued in other word processing systems. Also, this typewriter mode does not permit merging data from the mailing list, thereby defeating the program's

main purpose for existence.

At \$29.95, *Express* can help you prepare letters, labels, and envelopes affordably. While not incredibly powerful, it seems capable of handling small jobs with a little extra effort.

## Express Letter Processor

Mirage Concepts Inc.  
4055 W. Shaw Ave., #108  
Fresno, CA 93711  
(209) 227-8369

List Price: \$29.95

Requires: 64K RAM, one disk drive, PC-DOS

Circle 644 on Reader Service Card



***Our computers not only  
expand their configurations,***

**AVAILABLE IN  
8088 and 80286  
MODEL GROUPS**

***they expand your  
profits.***

**The PC/88. IBM Compatible in Performance & Quality.** It's an advanced technology computer with 3 model groups that give you a broad range of price/performance options. You make more profit, no matter what quantity you sell.

Volume  
Prices from **\$1,062**

**The PC/286. 1/3 faster than an AT for 1/3 less.** This is a high performance version of the PC/88 based on the 80286 (8 MHz) Micro-processor. You get 7 TIMES THE PERFORMANCE, 3 model groups & more profit. This is what the PC II could have been.

Volume  
Prices from **\$1,670**

And, both come with our unmatched:

- **BIOS COMPATIBILITY  
GUARANTEE\***
- **ONE YEAR WARRANTY\***

Interested? Give us a call. Today.  
Gulfstream Micro Systems  
800/443-0500  
Telex 9103800112  
5500 N. Federal Highway  
Boca Raton, FL 33431



***We're Products. We're Service. We're Support.***

\*GMS Guarantees This System To Be BIOS Compatible with the IBM PC/XT™. See Our Purchase Agreement For Details.

**CIRCLE 319 ON READER SERVICE CARD**



# New on the Market

## Copylink-Plus

U.S. Digital Corp. has announced a communications package that features a BASIC-like programming language for defining and automating communications procedures. Copylink-Plus language programs can be as large as needed to automate

permit the Copylink-Plus program to run unattended, and an unlimited disk-based phone directory allows automatic activation of programs with a single CALL command. Terminal emulations in the software include VT100/ANSI, VT52, and ADM3A/5/Keypro. Alternatively, the program accepts additional emulations via standard DOS drivers.

**List Price:** \$129.95

**Requires:** 128K RAM, one disk drive, PC-DOS.

**U.S. Digital Corp.**

5687-H S.E. International Way  
Portland, OR 97222  
(503) 654-0668

Circle 665 on Reader Service Card



Mail\*Call, Syscom Inc.

coming messages are stored in the nonvolatile memory and the user is alerted by a flashing signal light. The separate power supply permits the board to operate even when the PC has been shut off.

**List Price:** \$995

**Syscom Inc.**

470-B Lakeside Dr.  
Sunnyvale, CA 94086  
(408) 736-7320

Circle 666 on Reader Service Card

## Mail\*Call

Users wanting to receive electronic mail or other incoming messages when their IBM PCs are powered off or otherwise tied up in CPU-intensive applications are offered a solution in a new plug-in board from Syscom Inc. The Mail\*Call board is designed to work with any Hayes-compatible modem and can independently store up to 26,000 characters of incoming messages, freeing the user's system from message-receiving duties.

The plug-in board contains two serial ports, a real-time clock, an 8-bit CMOS microprocessor, 32K bytes of nonvolatile memory, and an independent power supply with battery backup. While the PC is being used for other purposes, in-

cludes Diablo 630 emulation, and incorporates both serial and parallel ports as standard equipment. The Genicom 3310 printer can also produce near-letter-quality reports at 90 cps and reproduce graphics at 72-, 144-, or 288-dot-per-inch resolutions. The printer is factory-set for the Courier type font, with additional fonts available as plug-in cartridge modules.

**List Price:** \$1,995

**Genicom Corp.**

One General Electric Dr.  
Waynesboro, VA 22980  
(800) 437-7468  
(703) 949-1000

Circle 663 on Reader Service Card

## Copylink-Plus, U.S. Digital Corp.

complex, repetitive procedures. Provisions for selective, buffered read/write routines permit data to be received, processed by local software, then retransmitted.

Commands in the Copylink-Plus language include such familiar statements as PRINT, GOTO, LET, GOSUB, and IF, as well as PEEK, POKE, INPUT, and OUTPUT, with assembly language subroutines. Other features include 32 user-definable function keys and 16 definable single-key command functions. Supported protocols include Xmodem, checksum, and CRC, plus a proprietary "Fast" protocol.

Remote-control provisions

## Genicom 3310 Printer

Genicom is offering a high-performance dot matrix printer that produces draft-quality printouts at up to 300 characters per sec-



Genicom 3310 Printer, Genicom Corp.

## New on the Market Submissions Guide

All submissions to New on the Market should follow these guidelines:

1. Include the retail price and details of both hardware and software needed for an end-user to properly use your new product. This includes required amount of RAM, number and type of drives, operating systems supported, and peripheral equipment needed.
2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements may be included, but in most instances we need more information than is typically included in an ad. Include telephone contacts for marketing and technical questions.
3. If available, include black & white glossy photos of the product, 4 x 5 inches or larger.

New on the Market does not review products; do not send sample or demo copies of software. All product announcements are run on a space-available basis, at the exclusive discretion of the editor. Please note that it is impossible to guarantee publication of a product announcement for any particular issue.

## Reminder

Designed for simplicity in use, the *Reminder* time management system from Campbell Services keeps track of the user's future workload up to December 31, 1999. The program requires only four items of data to be input for each entry. It checks against input errors by automatically calculating and displaying the number of days ahead when an event's date is input.

Completely menu-driven, *Reminder* also allows messages of up to 80 characters to be included by the user for each event's calendar entry.



**List Price:** \$39

**Requires:** 128K RAM, one disk drive, PC-DOS.

**Campbell Services Inc.**

**Software Division**

21700 Northwestern Hwy.,  
#1070

Southfield, MI 48075

(800) 521-9314

(313) 559-5955

Circle 661 on Reader Service Card

## CCMc RG Interface

Connecticut microComputer has released a microprocessor-based interface permitting up to 15 IEEE-488 devices to be controlled from a single RS-232 serial port. Called the CMc RG Interface, the device contains all the necessary hardware and software drivers to convert RS-232 signals into their IEEE-488 equivalents.

It understands simple ASCII commands and can be configured for talk or listen modes at all primary and secondary addresses. In the talk-only mode, the device's operations are transparent to the user's system, causing the connected IEEE-488 to appear as

a standard RS-232 device to the personal computer.

**List Price:** \$495

**Connecticut microComputer**

P.O. Box 186

Brookfield, CT 06804

(203) 354-9395

Circle 668 on Reader Service Card

## Tool Kit

PC users who like working inside their systems will appreciate the Tool Kit from Logistics Data Systems. It includes tools to install or replace multifunction cards, specialty chips, disk drives, modems, and other equipment. The set includes both straight-slot and Phillips-head screwdrivers, an alignment tool, a chip puller, and a chip inserter.

**List Price:** \$29.95 + \$3.50

shipping.

**Logistics Data Systems**

11325 Seven Locks Rd., #222

Potomac, MD 20854

(301) 983-8800

Circle 650 on Reader Service Card

## PIXTIK and PIXKEY

Balrog International has released two new products that address often-ignored problems in using the IBM PC and Lotus software.

Users of Lotus's 1-2-3 or Symphony programs who would like to run the software from a hard disk might find Balrog's PIXKEY worth investigating. This utility permits the Lotus software to be run from a hard disk while preventing unauthorized copies to be made of the program.

PIKTEK is a real-time clock for the IBM PC that will run for approximately 4 to 6 years on its own battery and does not occupy an expansion slot. The small device is plugged into the PC's parallel printer port. A connector at the back of the unit permits a printer cable to be plugged into the device.

**List Price:** PIXKEY, \$50;

PIKTEK, \$75

**Balrog International**

124 Lake Ontario Pl. S.E.

Calgary, Alberta

Canada, T2J 4X8

(403) 271-7171

Circle 652 on Reader Service Card



Tool Kit, Logistics Data Systems

## Digi-Pad "A" Series

GTCO Corp. has developed a new line of digitizing tablets featuring a thinner structure, about 40 percent lighter than previous models. The Digi-Pad line, designated the "A" Series, incorporates a one-piece enclosure with a smooth perimeter, allowing the user to work close to the surface.

The tablets use GTCO Corp.'s absolute electromagnetic scanning technology to achieve a resolution of 0.001 inch, digitizing through up to 1 inch of non-metallic material. Digi-Pad "A" Series tablets are available in active area sizes of 24 by 36 inches, 36 by 48 inches, and 42 by 60 inches.

**List Price:** Varies according to tablet size.

**GTCO Corp.**

1055 First St.

Rockville, MD 20850

(301) 279-9550

Circle 653 on Reader Service Card

## ZOOM/Modem PC 1200

A 1,200-bit per second, Hayes-compatible modem with an open-architecture design is being offered by ZOOM Telephonics. The ZOOM/Modem PC 1200's open design permits the user to upgrade or customize the modem by modifying its on-board EPROM firmware using a spe-



Digi-Pad "A" Series, GTCO Corp.

cial command language. Option sockets allow the inclusion of a real-time clock, Touch-Tone detection, or on-board RAM for message buffering.

The modem is designed to accommodate the high-speed circuitry of the PC AT and supports four com ports. It is available with or without PFS/ACCESS. Alternatively, the ZOOM/Modem PC 1200 supports any communications program written to the Hayes command protocols.

**List Price:** \$249; with PFS/ACCESS, \$499  
**ZOOM Telephonics Inc.**  
 207 South St.  
 Boston, MA 02111  
 (617) 423-1072

Circle 664 on Reader Service Card

### BASICA Scientific Subroutine Library

Wiley Professional Software has announced a collection of 114 precompiled mathematical and statistical subroutines that can be incorporated into a user's own Advanced BASIC programs. The *BASICA Scientific Subroutine Library* contains routines for complex number operations in such areas as matrices with real and/or complex elements, polynomials, equations, statistical analyses, regression, and more. The software is distributed on three disks, one each for the

source code, compressed code for faster execution, and test programs with results.

**List Price:** \$125  
**Requires:** 128K RAM, one disk drive, PC-DOS.  
**Wiley Professional Software**  
 605 Third Ave.  
 New York, NY 10158  
 (212) 850-6788

Circle 656 on Reader Service Card

### Turbo POWER TOOLS

*Turbo POWER TOOLS* from Blaise Computing is a series of procedures designed to complement Turbo Pascal. Features include extensive string handling, extended screen support and window management, access to BIOS and DOS services, full program control allowing execution of any other program from within a Turbo Pascal application, and an interrupt service routine support.

**List Price:** \$99  
**Requires:** 128K RAM, one disk drive, PC-DOS 2.x.  
**Blaise Computing Inc.**  
 2034 Blake St.  
 Berkeley, CA 94704  
 (415) 540-5441

Circle 658 on Reader Service Card

### PC-Desk II

Software Studios has announced a new version of the popular *PC-Desk* user-supported program. *PC-Desk II* incorporates all of the features of the original program, including a calendar/reminder system, calculator, word processor, automatic phone dialer, mail merge facility, label and envelope printer, telephone directory, and name and address database.

In addition to these functions, *PC-Desk II* has a new memory partitioning feature that permits two applications programs to be active at the same time, with a single key command to switch between them. Information can be transferred between applications with a cut-and-paste command. The program's word processing function has also been enhanced with a Rolodex card printing feature and a range of new document formatting commands.

*PC-Desk II* can be freely cop-



*Turbo POWER TOOLS*, Blaise Computing Inc.

ied and distributed. However, registered users receive a 23-page instruction manual and are entitled to free updates and telephone support.

**Registration Fee:** \$49  
**Requires:** 128K RAM (192K for partitioning), one disk drive, PC-DOS.  
**Software Studios Inc.**  
 8516 Sugarbush  
 Annandale, VA 22003  
 (703) 978-3524

Circle 660 on Reader Service Card

### Essential Guide to the Library IBM PC

A series of five publications providing practical guidance for persons using the IBM PC in library settings is being offered by Meckler Publishing. The series covers the use of the PC in technical processing, public access, and library administrative support applications.

Volume 1 of the series, *Hardware: Set-Up and Expansion*, introduces the reader to the basic steps in setting up a PC in a library environment. The second volume, *The Operating System: Making the Most of the PC-DOS*, explains the functions of the PC's operating systems in nontechnical terms, concentrating on those

aspects of greatest significance to the application at hand.

Three additional titles complete the series: *Library Application Software*, *Data Communications: Going On Line*, and *Buying and Installing Generic Software for Library Use*. Each volume is published in a spiral-bound, 6- by 9-inch format for convenient use at a PC.

**List Price:** Each volume, \$19.95; all five, \$87.50  
**Meckler Publishing**  
 11 Ferry Ln. W.  
 Westport, CT 06880  
 (203) 226-6967

Circle 654 on Reader Service Card

### XTender II

PC Technologies is producing a new communications board that permits an IBM PC, XT, or AT to serve as a host computer for up to eight terminals, in effect creating a nine-station LAN via a single board. The XTender II occupies two slots in the PC backplane and operates under a derivative version of Digital Research's *Concurrent DOS* operating system. This hardware/software combination permits any of the connected terminals to run PC applications software and multiple versions of PC-DOS si-



*BASICA Scientific Subroutine Library*, Wiley Professional Software



multaneously and interchangeably without a problem.

The XTender II board contains both an 80286 and an 80186 microprocessor, with an optional 80287 math coprocessor also available. Options include 1 to 4 megabytes of RAM, an I/O interface unit external to the board with eight RS-232 serial ports, and utility software. It supports most standard ASCII terminals, as well as a range of disk and tape subsystems.

For PC-DOS software, the board provides a locking scheme that ensures data integrity and password protection. At each connected workstation in an XTender II setup, the user can interactively establish the size of memory required, which drives to utilize, whether to use the math coprocessor, which printer to use, and which communications port is available.

**List Price:** W/1MB RAM, \$4,995  
**PC Technologies, Inc.**  
 704 Airport Blvd., Box 2090  
 Ann Arbor, MI 48106  
 (313) 996-9690

Circle 667 on Reader Service Card

#### RAM 7

Seattle Computer has announced a new dual-function board for IBM PCs and compatibles called the RAM 7. This board includes

a clock/calendar and is available with 256K, 320K, or 384K bytes of RAM.

**List Price:** 256K, \$195; 320K, \$210; 384K, \$225  
**Seattle Computer**  
 7649 S. 180th St.  
 Kent, WA 98032  
 (800) 331-0246  
 (206) 251-9577

Circle 648 on Reader Service Card

#### UltraSyst

BASIC programmers might find UltraSoft's new UltraSyst BASIC program generator a convenient means of avoiding the tedious coding of complete applications systems. To create a BASIC application using the new software, the user enters data field parameters such as name, length, type, and acceptable ranges. A screen design is then created interactively, with both graphics and alphanumeric characters available to the user for any of the color combinations. UltraSyst then generates the actual BASIC code for a program based upon the defined parameters and screens.

Programs generated by UltraSyst feature interactive data input and inquiry screens with user-defined help and on-line messages, full or partial key record retrieval, cross-referenced fields,

and computed fields. Reports and inquiries may retrieve all or selected data elements. UltraSyst also includes ASCII and DIF file interfaces to outside software.

**List Price:** \$95; manual only, \$20  
**Requires:** 128K RAM, two disk drives, PC-DOS 2.x

**UltraSoft**  
 P.O. Box 44294  
 Denver, CO 80201  
 (303) 291-9623

Circle 657 on Reader Service Card

#### Vertical Market Journal

Amstar Micro has produced a directory of industry-specific software for a broad range of businesses. The Vertical Market Journal lists software developers with products for such industries as advertising, banking, manufacturing, real estate, and religion, as well as the medical and legal professions. Entries for software developers include contact names and phone numbers, the number of employees, and the number of years in business. For listed vertical market applications, the journal includes hardware and software requirements, the date of introduction, the number of units sold to date, and the availability of demo versions and source code. Developers are given up to two pages each to describe the features of their applications software.

A cross-referenced index allows the reader to locate applications programs by company, operating system, hardware, or program type. Also included in the journal are postage-paid reply cards that can be used to request additional information on programs of interest.

**List Price:** \$38 per quarter  
**Amstar Micro**  
 3305 Chisholm  
 Bryan, TX 77803  
 (409) 778-0115

Circle 655 on Reader Service Card

#### NCI Banking Card

Network Controls International has created the NCI Banking Card, a plug-in board that allows IBM PCs to attach to an IBM 4700 loop. Functioning as a diagnostic tool, the card captures loop communication information for

analysis. It can be later printed with the aid of an output feature. The NCI card is accompanied by software that makes PCs emulate 4704 terminals and includes a hotkey option that helps users toggle between the IBM 4700 environment PC-DOS.

**List Price:** \$795  
**Requires:** 128K RAM, one disk drive, PC-DOS.

**Network Controls International Inc.**  
 9 Woodlawn Green, #120  
 Charlotte, NC 28210  
 (704) 521-4357

Circle 649 on Reader Service Card

#### Typerite

This user-supported program can make almost any printer act like a correcting typewriter. Short notes, memos, envelopes, cards, and labels and other tasks too small to warrant booting a word processor can be done with little effort. Corrections are made on the current line prior to printing, so mistake repetition is unlikely. On-line help, tab set/clear is included as well as function key control of Epson printers features such as underlining, superscripts, enlarged, emphasized, and double-strike.

**Suggested contribution:** \$10

**Requires:** 64K RAM, one disk drive, PC-DOS, printer.  
**Christopher Wiley**  
 76 Berkshire Dr.  
 Williamstown, MA 01267  
 (413) 458-5572

Circle 651 on Reader Service Card

#### Aeius Gradebook

Aeius Corp.'s new classroom grading program, the Aeius Gradebook, can handle up to 16 classes of 48 students each, and up to 64 grades in letter, percent, or number-wrong formats. Written entirely in C, the software includes such features as pop-up menus, a built-in tutorial, and a range of report functions.

The Aeius Gradebook allows entered grades to be individually weighted for averaging. Report formats include a class grade sheet in normal or compressed print, grade averages in percent and letter grades, and individual student grades and averages.

**List Price:** 47.50 per copy; group rates as low as \$1.00 per teacher also available.  
**Requires:** 128K RAM, one disk drive, PC-DOS 2.x  
**Aelus Corp.**  
 P.O. Box 700457  
 San Jose, CA 95170  
 (408) 257-0658

Circle 662 on Reader Service Card

## AnalytiCalc

General Cybernetic Engineering's new low-cost program offers spreadsheets, graphics, database access, outline-based word processing, and equation-solving capabilities in an integrated package. *AnalytiCalc* is designed around the spreadsheet component, which can work with up to three times the number of cells possible in Lotus's 1-2-3.

**List Price:** \$49.95

**Requires:** 256K RAM, one disk drive, PC-DOS 2.x  
**General Cybernetic Engineering**  
 P.O. Box 748  
 Mt. Holly, NJ 08060  
 (609) 261-3709

Circle 659 on Reader Service Card

## Video-Memory Manager

Backing up hard disks is now as easy as using a video cassette recorder. Kirsch Technologies has developed the Video-Memory Manager, a full-size circuit board that interfaces video cassette recorders to the IBM PC. *Video-Memory Manager*, a software utility included with the board, backs up memory on floppies, hard disks, or video tape.

The Video-Memory Manager board plugs into any empty expansion slot on the PC or XT and converts digital data into an analog signal. This allows the operator easy interaction between video pictures and software-generated prompts.

Up to 96 megabytes of information can be reliably stored on one standard-length video cassette tape. Available options include an automatic tape positioning function (ATP), allowing users to pinpoint and manipulate any part of a tape from the PC keyboard.

**List Price:** \$550; with ATP, \$875

**Requires:** 256K RAM, one disk drive, PC-DOS, video cassette recorder.  
**Kirsch Technologies Inc.**  
 201 N. Riverside Dr.  
 St. Clair, MI 48079  
 (313) 329-7166

Circle 647 on Reader Service Card

## Living Literature Series

Bantam Books has announced a series of interactive fiction games featuring vocabularies of over 2,000 words that permit the player/reader to affect twists and turns of plot in the story



lines. Initial offerings in the *Living Literature Series* include *I, Damiano*, based on the science fiction/fantasy trilogy by R.A. MacAvoy, and *Sherlock Holmes in Another Bow*, based upon Arthur Conan Doyle's famous detective series.

In *I, Damiano*, the player/reader is placed in the 14th century, joining the wizard Damiano on an odyssey to protect the city of Partestrada against evil forces, led by Lucifer. The text-based game incorporates numerous graphics screens and animation features when used with color PC systems. It can also be played as a text-only game on standard monochrome equipment.

**List Price:** \$39.95

**Requires:** 128K RAM, one disk drive, PC-DOS.  
**Bantam Books Inc.**  
 666 Fifth Ave.  
 New York, NY 10103  
 (212) 765-6500

Circle 648 on Reader Service Card

## Firejet 500

A small-sized, U.L.-listed fire extinguisher rated safe for use with computer equipment has been developed by Firejet America Ltd. The Firejet 500 extinguisher contains Halon, a non-toxic, colorless, odorless, non-corrosive chemical fire retardant that does not leave a residue to clean up after use. Halon is considered safe for use in applications where health risks from other kinds of fire retardants have precluded the use of a fire extinguisher, such as near food. The chemical is effective on gasoline and grease fires as



Firejet 500, Firejet America Ltd.

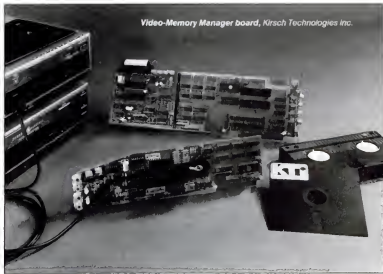
well as electrical ones, and will not cause damage to electronic circuitry otherwise unaffected by fire.

The Firejet 500 is only 8 1/4 inches tall, making it possible to keep the fire extinguisher in briefcases, glove compartments, and desk drawers near computer equipment. It is designed to be disposable, and does not require periodic refilling.

**List Price:** \$19.95

**Firejet America Ltd.**  
 250 Park Ave. S.  
 New York, NY 10003  
 (212) 674-8600

Circle 645 on Reader Service Card



Video-Memory Manager board, Kirsch Technologies Inc.

Contact us for other low prices on hardware and software.  
Next Day Air Extra

**FREE SHIPPING**  
**NO SURCHARGE FOR**  **OR** 

Call for latest prices.

## 10, 20, 33 and 44 MEG INTERNAL AND EXTERNAL HARD DISK SYSTEMS

	10 MEG	20 MEG	33 MEG	44 MEG
Internal	\$395	<b>\$495</b>	\$929	\$1129
External	\$545	\$645	\$1029	\$1229

Externals mounted with independent power supply and fan. Fully DOS 2.X or 3.X compatible. Both Internals and Externals boot from Hard Disk. 33 and 44 Meg Internal Disks include extender power supply. The system comes complete and ready to install with the Hard Disk, Controller, Cables, Manual, Software, and Mounting Hardware. One Year Warranty.

**10, 20, and 33 Meg Hard Disks are available with combined Floppy/Hard Disk Controller Card for additional \$75.**



Half Height



**COMPAQ<sup>®</sup>**  
**DESKPRO 286<sup>™</sup>** **CALL**  
It simply works better.

**COMPAQ<sup>®</sup>**

256K, 1/360K drive,  
10 Meg Internal

Functional equivalent to a Compaq Plus.

**\$2549**



Now using 3½" shock-mounted Winchester drives. The same as used in the Compaq Plus<sup>™</sup>. Also available with 2 half-height drives and 10 MEG HD—**\$2749**

Or upgrade your Compaq to a Compaq Plus<sup>™</sup> equivalent with our 3½" shock-mounted Winchester disk kit. Includes Hard Disk, Controller, Cables, Manual, software, and Mounting Hardware. One year warranty.

**\$519**

### Irwin Tape Backup System



- Uses Floppy Controller Card
- 10.35 Meg Formatted Capacity
- Used in Compaq Desktops
- Low Power • Half Height

10 or more \$495 each

**\$595**

**COMPAQ<sup>®</sup>**  
**DESKPRO<sup>™</sup>**

640K, One 360K Drive,  
One 10 Meg Internal Hard Drive  
Tape Backup Unit.

**\$3495**

Includes Monitor

With 20 Meg Internal Hard Drive—**\$3595**

With 33 Meg Internal Hard Drive—**\$4029**

With 44 Meg Internal Hard Drive—**\$4229**



Compaq is a registered trademark and Deskpro Plus and 286 are trademarks of Compaq Computer Corporation.

CIRCLE 344 ON READER SERVICE CARD



# PC: Mart

## **SPEED** IBM-AT

FOR A FRACTION OF THE COST  
OF YOUR "AT" INCREASE  
YOUR PROCESSING SPEED  
FROM 6MHz TO 10MHz.

DO IT YOURSELF,  
EASY 10 MINUTE,  
NON-TECHNICAL INSTALLATION  
KITS FROM \$10 TO \$49.95

TO ORDER CALL  
(818) 810-8443

**AMS** P.O. BOX 4795  
WHITTIER, CA 90605

CIRCLE 570 ON READER SERVICE CARD

## DISKETTES

**BONUS**

DISKS WITH A  
LIFETIME WARRANTY

SS/DD \$9.10

Box of 10

DS/DD \$10.80

Box of 10

RIBBONS— EPISON M830— \$3.95 EACH  
OKIDATA MICROLINE 80— \$1.95 EACH

RING KING— Disk Holder— Smoke  
Holds up to 75  
3.5" Disks— \$4.95 EACH

SPECIAL 3.5" DISKETTE HOLDERS— \$0.40 EACH

CALL TOLL FREE 1-800-556-8130  
IL CALL COLLECT 708 455-4488

**DJ Disk Jockey**  
P.O. BOX 35146  
CHICAGO, IL 60635-0146

CIRCLE 571 ON READER SERVICE CARD

## LOOKING FOR AFFORDABLE HIGH RESOLUTION GRAPHICS

### THE DRAWING TABLE is your answer!

- 640 x 200 high resolution mode
- Library functions
- File operations
- Easy to learn, menu driven
- Technical support
- IBM PC, XT, AT, true compatibles

**49<sup>95</sup>**

+\$3 S&H Visa/MC TN + 7.25%



**K SOFTWARE HOUSE**  
Software, Service, Consulting  
Rt. 2 Box 8381  
Unionville, TN 37180  
(615) 294-5090

CIRCLE 546 ON READER SERVICE CARD

## MAINTENANCE AND INSPECTION SYSTEM

A complete computer system for organizing, operating, and controlling an effective preventive maintenance planning program in any type of business or industry

- Manuals job instructions and equipment records
- Weekly or monthly reporting cycle
- Cyclical and irregular scheduling frequencies
- Working reports including work orders, foreman's reports and requirements reports
- Scheduled/unscheduled work reporting
- Skill and inventory requirements
- Complete work history
- Flexible retrieval and reporting system—operational, planning, and analytical reports
- Full screen input, menu driven online HELP
- For IBM PC/XT or PC/AT



P.O. BOX 27444, SAN JOSE, CA 95160

(408) 997-7703

CIRCLE 541 ON READER SERVICE CARD

## You type it in!

Save Money... activate our typesetting system with your PC. Books, manuals, newsletters, etc. Call or write for free operating information.



**ACCENT GRAPHICS**  
226 So. 16th St. • Lincoln, NE 68508  
(402) 475-5533

CIRCLE 547 ON READER SERVICE CARD

## PROOFWRITER™

For the IBM, TI, PC, XT, or AT's  
and Compatibles

Word Processor,  
Program Editor, &  
Spelling Checker



For Scientific and  
Multilingual Applications

**PROOFWRITER**  
INTERNATIONAL/SCIENTIFIC \$300  
Plus CHARACTER PROM \$125  
(21 PROMS now available)

**PROOFWRITER GRAPHICS \$425**  
(Software designed screen characters)

2 Disk Drives with 1 being  
Double Sided/256KB

DEMO DISK \$5 VISA/MC

## IMAGE PROCESSING SYSTEMS

6409 Appalachia Way  
P.O. Box 5016

Madison, WI 53705 U.S.A.

(608) 233-5033

CIRCLE 555 ON READER SERVICE CARD

## DYNAMIC RAMS

41256	120ns	\$3.15
✓41256	150ns	\$2.50
4164	120ns	\$0.75
✓4164	150ns	\$0.65
128K	150ns	\$5.50

• CO-PROCESSORS  
8087 2 \$105.00  
8087 3 \$115.00  
8087 3 \$195.00

• STATIC RAMS  
284K P-15 150ns \$4.50  
512K P-15 150ns \$1.75

© 1988/89 Microtec Corporation

## I.C. EXPRESS

2525 South Broadway, Suite 200, San Jose, CA 95128  
Phone: 800 399 3666 (Main Pk) & 5-341-931

ORDER TO LL FREE  
(800) 892-8889 • (800) 882-8181

Call for current prices & volume discounts.  
Prices shown for 1000 units. Minimum order 100 units.  
Shipping & handling charges extra. Add \$1.00 per unit for A.L. Merchandise (California Residents)

CIRCLE 548 ON READER SERVICE CARD

## ATTENTION MEGABYTES

Let your PC grow!

Vfeature  
for IBM AT, XT and compatibles  
supports BIG disks  
secures disk data.

Vfeature operates with AT & XT compatible  
hard disk controllers.

## Golden Bow Systems

895-80  
444 St. for shipping  
handling  
California residents add  
6% sales tax



2280 Second Ave., Suite F  
San Jose, CA 95131  
(408) 765-5240

CIRCLE 552 ON READER SERVICE CARD

## TOSHIBA USERS — LOOK!

P1340/1350

## DOWNLOADABLE FONT CAPABILITY GET COMPLETE PRINTER CONTROL

- includes the legendary IBM ↔ TOSHIBA PRINTER INTERFACE
- For use with P1340, P1350 P1351 and P351 TOSHIBAS
- all extended capabilities of the TOSHIBA available using an IBM or compatible
- bit mapped graphics supported
- screen dumps in text and graphics modes
- escape sequences supported
- prints IBM upper ASCII characters (jprint math, block graphics, etc.) 1/8" screen dump or text mode
- supports other market available font lines
- load font files directly into the interface on the P1340/1350 — translates downloadable capability of P1351/351
- menu driven utility reconfigures interface to support almost any software
- popular software supported directly
- Softways and Pprint-Vision support
- dealers and distributors welcome

PRICE: \$79.95 plus 2.50 shipping & handling  
VISA/MasterCard



INTEGRATED DATA TECHNOLOGIES, INC.  
4775 Buncherry Lane, San Jose, CA 95131  
(408) 251-2288

CIRCLE 558 ON READER SERVICE CARD



# PC: Mart

**\$ NOTHING IS UNBEATABLE \$**  
**SMALL ADV.**  
**BIG SAVINGS \$\$\$**

**HD'S FOR IBM PC, XT, AT AND COMPATIBLES**  
 INCLUDES CONT. CABLES, H.W. FORMATTED  
 10 25 MB INTERNAL ..... \$429.500  
 20 44 MB INTERNAL ..... \$679.1105  
 17 112 MB INTERNAL ..... \$1799.4165  
 AT 20 25 MB HD WITH HD INTERNAL ..... \$549.119  
 AT 44 71 MB HD INTERNAL ..... \$1029.1695  
 AT 120 MB HD INTERNAL ..... \$3995

**TAPE BACK-UPS FOR PC XT COMPATIBLES**

10 MB INTERNAL TAPE ..... \$395  
 25 MB INTERNAL, 4 HT ..... \$495  
 35 MB INTERNAL, 5 HT ..... \$795

## SYSTEMS

IBM PC 256K + 10MB ..... \$2570  
 IBM PC 256K + 20MB ..... \$2795  
 IBM PC 256K + 30MB ..... \$2895  
 IBM AT 512K + 20MB ..... \$3440  
 IBM AT 512K + 30MB ..... \$3540  
 COMPACTIBLE 256K + 10 MB ..... \$2525  
 COMPACTIBLE 256K + 30MB ..... \$3419

**MINIMUM ORDER \$300**  
 PRICE & AVAILABILITY SUBJECT TO CHANGE  
 C/D REQUIRES CASH/CR. MC & VISA ADD 3%  
 ALL SALES FINAL. DEFECTIVE MERCHANDISE UNDER  
 WARRANTY WILL BE REPLACED

**ELECTRO DISTRIBUTING**

1355 Newport Avenue #32  
 Fullerton, CA 92631

(714) 632-9900

**CIRCLE 551 ON READER SERVICE CARD**

## WE KNOW MODEMS!

### HAYES SMARTMODEMS

1200 baud External w/software ..... \$ 379  
 1200 baud IBM PC/AT Internal w/software ..... \$ 349  
 2400 baud External w/software ..... \$ 429  
 300 baud External w/software ..... \$ 189  
 The Microcommodor w/software ..... \$ 199

**RACAL VADIC ..... MAXWELL**  
 2400 baud External w/software ..... \$ 429  
 1200 baud Ext/Int w/software ..... \$ 349  
 We carry the complete Maxwell line

### U.S. ROBOTICS

Passport 1200/1200 baud w/cable/spkr. soft ..... \$ 325  
 Courier 2400 baud External w/software ..... \$ 455  
 Microlink 2400 Internal IBM PC/AT w/software ..... \$ 455

CALL FOR FREE CATALOG!  TO ORDER CALL (800) 543-4308



517 Highway, San Luis Obispo, CA 93401

**CIRCLE 579 ON READER SERVICE CARD**

## PC EXPANSIONS

**AST SuperPack (64K)** ..... \$259  
**SixPack (384K)** ..... \$299  
**MezPack (64K)** ..... \$269  
**Advantage (128K)** ..... \$309  
**Advantage (1.5M)** ..... \$635  
**I/O Plus** ..... \$129  
**PCnet - starter kit** ..... \$89  
**Quadboard (64K)** ..... \$199  
**Quadboard (384K)** ..... \$249  
**Quadmeg AT (128K)** ..... \$319  
**Quadmeg AT (2M)** ..... \$609  
**Quadport AT** ..... \$105  
**HECULES graphics board** ..... \$319  
**Color Card with PP** ..... \$159  
**HAYES Modems** ..... \$349  
**Smartmodem 1200** ..... \$409  
**Smartmodem 1200B** ..... \$379  
**Set of 9 chips (64K)** ..... \$10  
**256K chips (4Kx2)** ..... \$4  
**8087 chip** ..... \$119  
**Maynard Disk Controller** ..... \$100  
**Sandstar Series** ..... \$109  
**Internal Hard Disks from** ..... \$609  
**MayneStream tape backup from** ..... \$979  
**Quime 142A** ..... \$109  
**Tecac FD-55B** ..... \$109  
**Tandon TM100-2** ..... \$109  
**CDC 1409** ..... \$119  
**Verbatim (dual) disks (10)** ..... \$25

## VLM Computer Electronics

10 Park Place • Monroeville, NJ 07060  
 (201) 267-3268 Visa MC Check or C/D

## NASHUA DISKETTES

**FIVE YEAR WARRANTY**

**75¢** each  
 Qty 100

5 1/4" 55/OD or DS/DD, your choice, with hub ring and Tynk elevs. bulk packaged, no labels. Shipping extra. For quantity 90, add 10¢ each

**Get the same low price our high-volume duplication customers get!**

**CALL TOLL FREE**

**1-800-331-4668**

In Colorado, 303-234-0871

ALF Products Inc. • Denver, CO

**CIRCLE 596 ON READER SERVICE CARD**

## TERMINAL EMULATION

**Softerm PC emulates over 30 popular terminals including the:**

- DEC VT102, VT220
- Data General D200, D410
- IBM 3101-20 (block mode)
- Hewlett-Packard 2622A
- Honeywell VIP7801, VIP7803

**Guaranteed Compatibility**

Call for free product brief  
 \$195 MC-VISA-COD  
 For the IBM PC/XT/AT, DG1, NEC, Wang PC, TI Pro, Gridcase, Tandy

## SOFTRONICS

3639 New Getwell, Suite 10  
 Memphis, TN 38118  
 901-683-6850

**CIRCLE 573 ON READER SERVICE CARD**

## IC'S PROMPT DELIVERY!!!

**SAME DAY SHIPPING (USUALLY)**

OUTSIDE OKLAHOMA, NO SALES TAX

8087-2 COPROCESSORS \$125.00	
256K	256Kx1 120 ns \$ 3.75
256K	256Kx1 150 ns 2.75
128K	128Kx1 120 ns 6.75
64K	160Kx1 150 ns 2.75
64K	64Kx1 150 ns 1.10
EPROM	
27C256	30Kx1 250 ns \$12.75
27C256	30Kx1 250 ns 6.00
27C256	16Kx1 250 ns 3.30
27C256	8Kx1 150 ns 5.25
27C256	8Kx1 250 ns 2.75
2732A	4Kx1 250 ns 2.75
STATIC RAM	
6264LP-15	8Kx1 50 ns \$4.75

OPEN 8:00-5:00 WE CAN SHIP VIA FED EX OR SAT

FACTORY NEW, PRIME PARTS  
 MICROPROCESSORS, UNLIMITED  
 24 000 S. Phelan Ave.  
 Bldg 200, Ch. 19071 (918) 267-4961

Prices shown above are for September 2, 1985  
 Prices are subject to change without notice. All prices are in U.S. dollars. All prices are for quantities of 100 or more. All prices are for quantities of 100 or more. All prices are for quantities of 100 or more.

**CIRCLE 608 ON READER SERVICE CARD**

## CompuTogs Dust Covers



**CompuTogs** offer the ultimate in protection. Hand stitched natural canvas with brown binding. They are far superior to vinyl at little extra cost!

### COMPARE OUR PRICES!

IBM PC Combo ..... \$4.95  
 IBM PC Keyboard ..... \$3.95  
 IBM PC Monitor ..... \$5.95  
 IBM PC 80 COL Printer ..... \$5.95  
 APPLE IIe Combo ..... \$4.95  
 AT&T Combo-Mono ..... \$2.95  
 Epson FX100 ..... \$7.95  
 Tandy 1000 Combo ..... \$4.95

—OVER 100 OTHER MODELS AVAILABLE—  
 TO PLACE AN ORDER CALL OR WRITE

**CompuTogs**  
 P.O. Box 2493  
 Nagaville, IL 62540  
 (312) 961-2968

VISAMC Accepted. Include \$2.00 Shipping.  
 CUSTOM EMBROIDERY SHOWN AVAILABLE  
 AT EXTRA CHARGE.

**CIRCLE 567 ON READER SERVICE CARD**

## 64K • 128K • 256K DRAMS

80287-8

80287-3

8087-3

8087-2

BITTNER



ELECTRONICS

899 SOUTH COAST HIGHWAY  
 LAGUNA BEACH, CA 92651  
 (714) 497-6200

PLEASE CALL FOR FREE CATALOG

**CIRCLE 564 ON READER SERVICE CARD**

## DEMOGRAPHIC DATABASE

\* IBM PC COMPATIBLE

\* 3189 U.S. COUNTIES

\* 957 LARGEST CITIES

\* ON 32 DISKETTES

\* INCLUDES DATA ON:  
 agriculture, banking, crime, education, government, health, households, labor force, land, manufacturers, personal income, population, poverty, retail trade, service industries, social security, weather ... and much more.

\* USED FOR MARKET AND SALES RESEARCH, INDUSTRY SURVEYS, CENSUS RESEARCH, ETC.

\* \$290.00 VISA & MASTER CHARGE

CALL TODAY!!

(714) 650-1000  
**MELISSA DATA CO.**  
 12 BALBOA COVES  
 NEWPORT BEACH, CA 92662

**CIRCLE 608 ON READER SERVICE CARD**

# PC BlueBook

## ■ ADVERTISING RATES AND INFORMATION:

Standard listings consist of a bold lead line (23 characters maximum); 7 lines of body copy (45 characters per line); 4 lines for company name, address and telephone number; \$200 per insertion—4 issue minimum. Additional charge for extra lines and company logos. Prepayment and frequency discounts available. American Express, MasterCard, Visa accepted. Copy subject to publishers' approval. Send typewritten or printed copy, reproducible logo art (if applicable) and remittance to Kathryn Cumberlander, Classified Sales Manager, Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016. For additional information, assistance, or to place an order by phone, call collect (212) 503-5115.

## ACCESSORIES

### SUPPLIES

#### KEYTOPS/KEY OVERLAYS

TOUCHDOWN™ full size keytops enlarge major control keys on IBM & look-alikes. state model & color ink or IBM grey \$21.95. TOUCHDOWN™ key overlays available for 5251, 5520, 3270 DISPLAYWRITE 2 & 3 WORD PERFECT 32/40 and most popular software, plus do-it-yourself kits. \$6.95-\$29.95 U.S. orders postpaid. HOOLEN COMPANY Dept. BB PO Box 201 Corvallis, OR 97335 (602) 634-7517

## BAR CODING

#### BAR CODE/LABEL PRINTING

THE LABEL MAKER™ prints bar codes, OCR-A like and large characters from data entered at keyboard or from disk files. Create and save unique printing formats and record layouts. Performs second add, change, delete, sort and select on disk files. A1 LABEL MAKER™ prints A4 shipping/parts identification labels required by Auto Manufacturers. Programs require IBM PC or work-alike. TJ SOFTWARE INC. PO Box 2044 Arlington Heights, IL 60060 (312) 364-1065

#### BAR CODE READERS/PRINTING

Print in-spec bar codes on Epson/Dedada Code 39 for 49. Add Code 39 2 of 5, UPC-A, Code-129 Programs for AAG (\$299), LOGMARIS, HIBC-\$199. Read above bar codes thru keyboard attachment into any program without mode on i-PC, XT, or AT. no sol. no serial pr. \$595 (printing included). \$10 demo disk. Visa/MC. Data Solutions Systems 130 Chesapeake Court Santa Cruz, CA 95060 408-458-9938

#### BAR CODE READERS/MAGNETIC STRIPE READERS

TPS provides Bar Code and Magnetic Stripe Readers and combinations of these for simple installation on IBM PC, AT, and 3180 terminals, DEC Rainbow, Professional, and VT 220 series terminals. NCR Decwriter/Make IV and PC IV, TI Professional, AT&T/Olivetti, Wang PC and VS 4200, Apple Macintosh, Northstar Dimension. Bar code label printing program \$50 wysiwyg purchase. TPS Electronics 4047 Transport Street Palo Alto, CA 94303 (415) 856-6833

## BUSINESS OPPORTUNITIES

#### GRAPHICS DEALERS NEEDED!

Nations largest stocking distributor of Mitsubishi high resolution color graphics display monitors currently seeks dealers/WAOs aggressively selling the CAG, CAD, CAM markets. Competitive pricing structure and quantity incentives to qualified accounts. Call for complete information letter. Data Systems Division 21332 La Cadena Laguna Hills, CA 92653 714-859-3600

#### MONEY MAKER FOR CONSULTANTS

Low time management is the key to your share of \$5 billion and specialized software-hardware sales projected by 1990. LTM time and billing software for large and small professional firms has received a published national news review. Use it for your own billing and sell it to attorneys, CPAs, and all others who bill for their time. Dealer discounts on every sale. LTM is consistently chosen over heavily advertised products some costing 10 times its \$495 price. Send for details. MEGA MEDIA, Inc. 8990 Lloyd Place Los Angeles, California 90069 213-278-5249

#### START YOUR OWN OEM BUSINESS

With our IBM PC/XT Compatible System. For only \$750 (complete system) including 256KB RAM, Two 360KB Floppy Drives, Mono/Color Video Card, Multifunction 512K Card with real-time clock/calendars, rechargeable battery, game control. High Quality detachable keyboard (83 keys). Color Monitor (Thomson) \$300. GMG Computer Services Pte. Ltd. 108 Robinson Road #08-01 GMG Building Republic of Singapore Tel: 22591111 Fax: RS22068 GMGCS

## COMPUTER/INSURANCE

#### SAFEGUARD

If your computer is important to you, insure it! SAFEGUARD provides full replacement of hardware, media and purchased software. As little as \$39 a year covers fire, theft, power surges, earthquake, water damage and auto accident. Call 8am to 8pm Monday thru Friday. Saturday 9am to 5pm. SAFEGUARD, THE INSURANCE AGENCY INC. 2929 H. High Street Columbus, OH 43202 (614) 262-0559 (toll-free) (800) 848-3469 (NAT)

## COMPUTER SERVICES

#### WANTED: YOUR COMPUTER INTERNATIONAL COMPUTER RESALES

Interested in Selling or buying a new or used computer? We are the nation's largest and oldest clearinghouse.

Call today  
National Toll-Free: 1-800-447-0030  
In Florida Toll-Free: 1-800-345-0030



ISI Advertising  
5401 Kirkman Rd. Suite 735  
Orlando, FL 32819  
(305) 345-0003

## COMPUTER REPAIRS

#### IBM PC/XT/PPC & COMPAG PORTABLE REPAIR

Circuit boards and electronic sub-assemblies professionally repaired on ATE (Automatic Test Equipment). An alternate solution, with lower pricing and fast turnaround. Dealer & Manufacturer packages available. From keyboard to power supplies. Call UNITRACE 2188 Del Franco St. San Jose, CA 95131-1575 (408) 946-1090

## COMPUTER TRAINING

#### TRAINERS EDITION

Of the award winning series "How to use your IBM PC in 10 easy video lessons" is NOW available from Video Learning Library, Ltd. This great tool for trainers includes a two hour video, Trainer's Guide and overhead. This edition is designed so that training can be customized to your companies hardware and software needs. It's the best priced training tool on the market for only \$199.95.

Video Learning Library, Ltd.  
150 Shoreline Highway Building E  
Mill Valley, California 94941  
415-332-7544

## DATA BASE MANAGEMENT

#### FOR IBM PC AND NEC APC III

- \* Data Base Management System
- \* Report Generator
- \* Full screen text editor with painting and drawing capabilities
- \* Menu-driven system, on-line help
- \* User-defined forms for data entry
- \* Query by example
- \* Search and sort on up to 512 fields
- \* Quick or complex multi-sectional report with calculations. Not copy protected. Clear Cut Price—\$49. Add \$5 for shipping.
- MeriteSoft  
5 Cheryl Pl.  
Merite Park, CA 94025  
415-326-7285

## BLUEBOOK

### DATA CONVERSION

#### DON'T REKEY-CONVERT!

We use the latest disk, tape, scanning, & telecommunications technology to reform data for you. QUICKLY AND ACCURATELY USUALLY AT ONE TENTH YOUR CURRENT COST! We transfer data between word processors, typesetters, micros, minis, mainframes, & software packages. We supply a full range of consulting services including Data Customization and Database Development.  
Data Conversion Laboratory  
67-27 168th Street  
Fresh Meadows NY Y 11365  
718-939-4521

### DISK CONVERSION SERVICE

#### WP & PC MEDIA CONVERSIONS

The oldest media conversion bureau and trans-actor manufacturer in the nation! We build the devices most others use for their conversions. We convert all major WPs, IBM PCs, 9-tracks, etc. While maintaining easy edit ability. Guaranteed best price and turnaround!  
Systems Compatibility Corporation  
410 N. Michigan Ave.  
Chicago, IL 60611  
(312) 329-9700 or (800) WP-CODES

### DISKETTE COPY SERVICE

#### BLANKET ORDER SERVICES

Diskette duplication, packaging, stocking and drop-shipping services based on your long-term needs. Place a blanket order for as many as you need them for large or small quantities at a fixed price. No extra charge for "mastering", label printing or application.

STAR-BYTE, INC.  
2564 Industry Lane  
Newtown, PA 19401  
(215) 539-4900 (800) 243-1515

#### 9 TRACK TAPES to IBM PC

Convert mailing lists or other main frame data on 1600 BPI 9-track tapes to PC-DOS 5.1 diskettes. New automated process guarantees data verification. Easy instructions for loading to your data base (dBase II, dBase III, etc.) or hard disk. Only \$60 per million chars. \$95 minimum. Bernoulli box \$30/M.  
A.S.I. Inc.  
1259 El Camino, Suite 260  
Menlo Park, CA 94025  
(415) 323-6338

#### PERFECT COPIES GUARANTEED

Why risk duplicating your important programs on your computer, when our equipment is designed solely to duplicate disks and verify their perfection 100%? Over 600 formats 3 1/2", 5 1/4", 8". Plus serialization, copy protection, labeling, packaging, shrink-wrapping and fast, personalized service.



**Western  
Transdata Inc.**  
DISK DUPLICATION

WESTERN TRANSDATA, INC.  
1701 E. Edinger Ave. Building C  
Santa Ana, California 92705  
(714) 547-3383 (Collect)

### HARDWARE ADD-ON BOARDS

#### IEEE-488 INTERFACE

Has the IEEE-488 interface and software turns your PC, AT or compatible into an instrumentation workstation for the lab, test, and measurement. We are the major OEM supplier with interfaces for 10 different architectures and the most comprehensive coverage of operating systems and languages. \$385 software \$75.  
NATIONAL INSTRUMENT  
12109 Technology Blvd. Dept PC  
Austin, Texas 78727  
(800) 531-5066 or (512) 250-9119

#### \$200 PER MEGABYTE

Memory expansion for your IBM PC, XT or AT at \$200 per megabyte. All the memory you've dreamed of at a price you can live with. JRAM-2 and JRAM-AT hold up to 2 megabytes per board with Ser/Par/Disk also available. Memory and I/O ports all in one slot!



TALL TREE SYSTEMS  
1120 San Antonio Road  
Palo Alto, CA 94303  
(415) 964-1990

### HARDWARE COOLING DEVICES

#### SILENCE & COOL YOUR PC

Does your PC sound like a high speed turbine? Does it use expansion cards that create extra heat? Solve your noise & cooling problems with the SILENCER from PC Cooling Systems. The SILENCER utilizes a super quiet West German, all metal, 4 1/2" tube axial fan. Tests show that it operates with 84% less noise than the 3" plastic fan it replaces. Mounts to existing holes on the back of the IBM PC, XT or clone. \$79.95 plus \$3 S/H. CA. 6% VISA, MC, or check.  
PC COOLING SYSTEMS  
31510 Via Ararat Dr.  
Bonsall, CA 92003  
(619) 723-9133

#### FIXED DISK BIOS/BOOT

Full BIOS from most popular Hard Disks—DAVON, XIBEC, DMEGA, GT LAKES, etc. Adds XT-like BIOS interface to your disk for PC. Security, multiple volumes, removable media support optional. No slot plug-in installation. Specify controller and computer with order. \$80-\$180. Add \$3 ship. CA tax.



GOLDEN ROW SYSTEMS  
PO BOX 3039  
SAN DIEGO, CA 92103  
619/798-9549

### HARDWARE COMMUNICATIONS

#### DATA ANALYZER FOR \$195

Both a serial data monitor and protocol emulator, this board and software has extensive simulation programming capabilities. Handi-, SDC, BSC, and ASCII. Now, you can buy both a computer and a protocol analyzer for less than the price of competitive analyzers. For that unit call.  
PROTOCOL CHANGERS  
1055 SANTA ROSA  
COSTA MESA, CA 92626  
714-546-5068

#### SMART ANSWERING MACHINE

SAM transforms your IBM PC into an intelligent phone answering & real-voice messaging center. FEATURES: 999 personal messages, call screening, message forwarding, timed or grouped message delivery, portable phonebook/audiotape, time/slate log, voice prompted remote access. AND MORE! All hardware & software included. INTRODUCTORY SPECIAL \$295 VISA/MC.



DALECTRON, INC.  
2035 California St., Ste #17  
Mountain View, CA 94040  
(415) 960-3040

### HARDWARE DISK DRIVES

#### 1.2MB PC-AT DISK DRIVES

AT your PC by replacing your obsolete controller and adding a high-density disk drive. DISKETTE handles 1 to 4 diskette drives plus an I/O module. \$249 for JOKETTE-SA, \$250 for Teac 55GF (12MB), \$200 for Teac 55B (300-K) \$180 for Ser/Par/Ck module.  
TALL TREE SYSTEMS  
1032 Elwell Court, Suite 124  
Palo Alto, CA 94303  
(415) 964-1980

### HARDWARE PLOTTERS

#### FORTRAN & C PLOT LIBRARIES

PLOT/IT & PLOT/HP are FORTRAN & C callable plotting routines for Houston Instruments, Hewlett Packard, and HPGL compatible plotters. Over 45 routines in each library. Draw axes, label text & numbers in user specified direction & orientation. Package supports Microsoft Fortran, Digital Research Fortran 77 and Ryan McFarland Fortran. Comes w/manual. \$200 each.  
The Librarian, Inc.  
10435 Greenbush #110  
Stamford, TX 77477  
713-499-7662

### HARDWARE POWER PROTECTION

#### MEIRICK STAND-BY POWER

THE MEIRICK STAND-BY POWER SYSTEM provides back-up power and protection from power failures, brownouts, surges, spikes and power line noise. The enclosed battery will supply a long run time during a power failure. 240 watt system-\$365, 400 watt system-\$495, 800 watt system-\$795.  
MEIRICK INC. POWER SYSTEMS DIVISION  
Box 298  
Frisco, CO 80443  
(303) 668-3251

### HARDWARE STORAGE DEVICES

#### COUPLER FOR 9 TRACK TAPES

Two models available to read and write 1/2 magnetic tape with formatted 9-track drives. Runs all speeds and densities in PC, XT and AT running MS-DOS or XENIX. Data transfers up to 904,000 bytes per second! Complete with cable and software. Prices start at \$880.  
OVERLAND DATA, INC.  
5644 Kearny Mesa Rd.  
San Diego, CA 92111  
(619) 571-5555

# BLUEBOOK

## MAILING LISTS

### MAILING LISTS

New over 855,000 micro owners. Select by brand: 219M Apple, 179M IBM PC, 156M IBS-80, 97M Commodore and more! 9 phone verified letters lists including 6,211 stores. VARs chain buying offices. Canadian and more! 25,000 Unix users. 14,000 computer companies. Lists by software brand (printer model), modem owners, investors, educational, etc. Over 75 different micro and mini lists. Call or write for FREE catalog. Include phone and type of business you're in by Barchine. TARGETED MARKETING INC. Box 5125 Ridgewood NJ 07451 (201) 445-7796

## PUBLICATIONS

### CATALOGS

### EASY WAY TO MASTER DOS!

New handbook shows how, why, and when to use all 44 PC & MS-DOS commands quickly and easily! Lively hands-on tutorial makes learning fun, for a change. Covers basic thru advanced topics. All versions up to 3.1. Lots of practical examples. 221 pages only \$15.95 at book stores or send check - \$1.00 S&H to LITTLE, BROWN & COMPANY PUBLISHERS 200 West Street Code M-368121 Waltham, MA 02254 1-800-343-9234 (credit cards)

## TAPE TO DISK CONVERSION

### TAPE TO DISK CONVERSION

Convert any 9-track magnetic tape to or from over 300 formats including 3in, 5in, 8in disk formats and word processors. Formats available include IBM PC, APPLE, Ales, TRS80, CP/M, Oxyplay, IBM SYS/390, Macintosh, Wang, LANER, OS/2 and 300 more. Ask to disk conversions also avail. Call for more info. PRIVATE COMPUTING SERVICES, INC. 47 W. Dundee Rd. Wheeling, Illinois 60090 (312) 459-6070

## SOFTWARE

### ACCOUNTING

### CUSTOM PAYROLL

All systems support multiple pay categories, calculation of all taxes, user-defined deductions, exceptional item handling, a variety of necessary reports, paychecks and W-2 forms. Written in PC Basic with full source included for easy maintenance. Prices start at \$695.00 for basic system and manual. DATASMITH, INC. Box 8036 Shawnee Mission, KS 66208 Phone: (913) 381-9918

### PC-FUND

PC-FUND is a fund accounting system for local govts, schools, colleges, and not-for-profit groups. The system includes General Ledger, Report Writer, P/O Encumbrance, payables, receivables, payroll/personnel, budgeting, utility bills and fixed assets. The system supports up to 99 funds, 9999 departments and up to 36 fiscal periods are on-line. PC-FUND runs on the IBM PC and most MS-DOS & XENIX computers. AMERICAN FUNDWARE, INC. P.O. Box 773028 Steamboat Springs, Colorado 80477 (303) 879-5770

### ARCHITECTS AND ENGINEERS

AEMAS System is designed specifically for architects, civil engineers & other professional firms where monitoring project costs is required. Modules available are job costing, payroll, A/R, A/P, general ledger & automatic invoicing. Interactive modules stand alone or run in any combination. Contact Sales Department. DATA-BASICS, INC. 11000 Cedar Rd. #110 Cleveland, OH 44106 (216) 721-3400

### EARN CPE CREDITS

Computerized study/assessment program makes updating professional competence fun and easy. Both multi-user office packages, and individual programs available. Select subjects, from 1 to 20 hours. Certification of completion included. Written, administered by accounting professionals.



P.O. Box 6512 Huntsville, TX 77340 1-(800) 241-9700 In W.Va. (850) 642-2677

**MicroMash** MICRO MANAGED STUDY HELP

### CONSTRUCTION ACCOUNTING

CMAS SYSTEM is designed specifically for commercial contractors where tracking job costs is required. Modules available are job costing, P/R, A/R, A/P, G/L, automatic invoicing and estimating. Interactive modules run stand alone or in any combination. Contact Sales Department. DATA-BASICS, INC. 11000 Cedar Rd. #110 Cleveland, OH 44106 (216) 721-3400

### CRYSTAL PAYROLL

Fast and easy to use. Computes wages and taxes in seconds. Prints checks with itemized stubs or stubs only (after the ten). User defined pay types for hourly, salary, daily, bonus, commission, tips, and piece rate wages, expenses, and ten voluntary deductions including 401Ks. True multiple pay and deduction rates. Allocation to multi GL acc'ts and depts. Multi company ideal for payroll services. Federal, state and local taxes with flexible employer options. Quarterly and year-end reports. Standard \$395, Restaurant \$595, Construction \$695, Farm \$595, VISA, AMEX. 30 day money back guarantee. CRYSTAL SOFTWARE 3100 Broadway, Suite 203 Boulder, Colorado 80302 (303) 443-5528

### CPA EXAM PREPARATION

NEW IBM multi-user office package takes work out of preparation. Questions with referenced solutions generated by AICPA exam weights. Study single, multiple or all categories. Times, scores, updates, provides progress report with study recommendations. Individual program sold by section.



P.O. Box 6512 Huntsville TX 77340 1-(800) 241-9700 In W.Va. (850) 642-2677

**MicroMash** MICRO MANAGED STUDY HELP

### G/L ACCOUNTING POWER

Now, the same financial reporting power used by offices of all the "Big 6" is available to corporate controllers. AMI's DATAWRITE - Corporate General Ledger gives complete flexibility for custom reports. Fused Asset Management and Financial Plan Link to Lotus 1-2-3 - are available too. Nationwide support. Accountants Microsystems Inc. 3533 136th Place SE Bellevue, WA 98006 800-426-8201, 206-643-2050

## SOFTWARE

### BAR CODE

### BARCODE SYMBOL GENERATION

Print bar code written on IBM PC/XT/AT/CompuLink using PC/MSDOS. Supports for DRI 84, 92, 99, 2410, Epson FX, Fujitsu OPL24 IBM Graphics, HP Laser & Toshiba P351. Prints Code 39, 93, 2 of 5 1 of 5, Codebar. A/P & OCR on label speed. Keyboard or file driven. Inc/dec numbers. LOGMARS, JAG and HBC. (DATAFLOW TECHNOLOGIES, INC. 8422 Bellona Lane, Suite 303 Towson, MD 21204 (301) 296-2630 / 866-2366

## SOFTWARE

### BUSINESS

### TIME ACCOUNTING & BILLING

TABS is designed for use by professionals who bill on the basis of time (attorneys, accountants, etc.). A 8.6 approved Quick-easy entry and edit. TABS is easy to understand and operate. Still a full feature software is currently in use by over 1400 firms nationwide. PC-DOS, MS-DOS, Novell Networks. For details contact:



SOFTWARE TECHNOLOGY, INC. 620 N. 48th, Suite 120 Lincoln NE 68504 (402) 466-1197

### dBASE II/III SOFTWARE

GENERAL LEDGER (integrates w dBASE/IV) \$39 dBASE/II (Billing & A/R) \$39 SALES ANALYSIS (works with dBASE/IV) \$39 JOB COSTING (for Contractors) \$39 JOB ESTIMATING (works with Job Costing) \$39

SOURCE CODE included for dBASE II or III. Require printer, 2 360K Floppies or Hard Disk. DATAMAR SYSTEMS - (619) 584-2727 3550 Camino Del Rio North - Suite 208 San Diego, CA 92108 Master Card-Visa-Check-CCD

### HardRunner™

Run Lotus without system dBASE! This is the authentic HardRunner™ program that allows you to run Lotus and Symphony from your hard disk without the need for a system floppy in the A drive. \$34.95 plus \$5 s&h. For further information see advertiser index listing for Neotradamus. NOSTRADAMUS 5320 South 900 East Salt Lake City, UT 84121 (801) 261-0769

### MYTE MYKE™ BUSINESS SYSTEM

Commercial grade, integrated business application software. Order Entry, Inventory Control, Sales Analysis, Accounts Receivable, Accounts Payable, General Ledger, Purchase Orders, Pro-Time-time and billing, Invoicing & support. avail. PC-DOS, MSDOS, NOVELL Networks, XENIX & UNIX.



M&O SYSTEMS, INC. 3885 N. Buffalo Rd. P.O. Box 108 Orchard Park, NY 14127 (716) 662-6611

### PROFESSIONAL TIME/BILLING

Handles 400 clients, 20 partners, 80 job (840 out of pocket expense) descriptions, 20 area of practice codes, lived fee or per hour billings, & more. Prints billings, monthly statements, aged receivables, & more. Free telephone support \$149 (VISA, M/C, AMEX). Other original software. Call/Write for FREE CATALOG. MICRO-ART PROGRAMMERS 173 Birch Avenue Cayce, CA 95630 (805) 995-2329 (24 hour)

### LP86-LINEAR PROGRAMMING

A powerful menu-driven system for solving linear programs with up to 255 constraints and 225 variables. A new program menu version accepts problems up to 510x250. Features include interactive and batch operation spreadsheet-style input and editing, a storage system for problems and bases, sequential file input/output. Simplex algorithm restart, a complete report generator, sensitivity analysis. Releases 190X \$99 with 8087 support, user's guide. VISA/MC EASTERN SOFTWARE PRODUCTS INC. P.O. Box 15326 Alexandria, VA 22309 (703) 549-5469

## SOFTWARE

### BUSINESS PROJECT MANAGEMENT

#### AHA! (408) 458-9119

You found it! The number to call for software to manage any complex project, e.g. R & D, CONSTRUCTION, BUSINESS/VENTURE PLANNING! Demo Sampler-Pack includes PMS-II, RMS-II, MMS-PI, HARVARD TOTAL PROJECT MANAGER, HORNET, PERT-MASTER, TIME-LINE, SCORUM-SUPER PROJECT PLUS! Our staff of Project Managers and Microcomputer professionals provide NEEDS ASSESSMENT, SET-UP TRAINING, INDIVIDUAL CONSULTATION by arrangement!



AHA! INC. PO Box 8405  
Santa Cruz, CA 95061-8405 (408) 458-9119  
Project Management SERVICES

#### PRIMAVERA PROJECT PLANNER™

The most project management you can get from a micro. Plan and schedule networks of up to 10,000 activities. Level resource use. Control schedule resources and cost. Call or write to find out why Primavera is used by managers worldwide for improved project performance. Primavera Systems, Inc.  
Two Bala Plaza Suite 925  
Bala Cynwyd, PA 19004  
(215) 667-8600 Telex (910) 997-0487

#### MicroPERT™ 1

Multiplatform scheduling for IBM PC, XT, AT & iMac compatibles. Timescaled Network Diagram, Gantt chart, Cost/Resource Histogram on screen or printer & standard reports. Up to 220 subprojects. DF output. Extensive manual. 1 Year limited warranty. Call/write for brochure. Price \$350.00 (Demo \$25.00).  
Sheppard Software Company  
4750-P Clough Creek Road  
Redding, California 96002  
Phone (916) 222-1553

## SOFTWARE

### COMMUNICATIONS

#### FAST, SMART FILE TRANSFER

Want to transfer files between PCs without the expense of a network? FASTWIRE and a serial cable can send your files error-free much faster and easier than using Hoppers. Send files at 115.2K baud in seconds, or, via XT, AT (10 meg) in less than 30 minutes! \$50. Quantity discounts. Ask about XENIX PARAGON COMPUTER CONSULTANTS.  
3877 North 200 East  
Provo, UT 84604  
(801) 226-3794

#### TELEX LINK SOFTWARE

Link your computer to telex service via ITT, RCA or WU with Cawthon's telex software. Designed specifically for telex communications. Cawthon software is easy to use, has on-line help, self-test diagnostics, frequently called numbers, and an excellent User's Guide. Cawthon software is available for many computers and operating systems.



### Cawthon Scientific Group

24224 Michigan Avenue  
Dearborn, Michigan 48124  
Phone (313) 565-4000

#### COMPUTER BULLETIN BOARDS

Join the popular world of PC communications with one of our easy to operate computerized message systems complete with printed manual.

- IDEA-TREE multiple topic \$139.00
  - PC-Q&E mailmaking \$99.00
- Customized and other systems are available. On-line demo at (206) 932-7125. VISA/MC.

PROLOGSOFT  
PO Box 16756  
Seattle, WA 98116  
206-932-5310

#### NEW!! PC-COMM

General purpose asynchronous communications program, up to 9600 baud, for IBM-PC and compatibles using DOS 2.00 and up. Supports manual/autodial modems and XMODEM and XON/OFF protocols. Stores 26 user-defined frequently called remote locations. Many more features. Only \$49.95 plus tax in Calif.

MICRO DIMENSIONS  
8825 Aero Drive Suite 315  
San Diego, CA 92123  
(619) 278-2700

## SOFTWARE

### DATA ENTRY

#### KEYENTRY III™

The premier data entry system available for PCs, with thousands of users world-wide. A comprehensive all-purpose system with an unmatched range of features and capabilities. Acclaimed for its ease of use and operator efficiency. Superbly documented, including outstanding tutorials. From \$295 to \$995. Demo is available.



**SCS**  
Quality products

SOUTHERN COMPUTER SYSTEMS, INC.  
2732 Seventh Avenue South  
Birmingham, AL 35233  
(205) 251-2985

#### DATA ENTRY EMULATOR

Head-down data entry for the PC will allow fast and accurate preparation of batch data files. The program can redefine the keys for a 3741 Data Entry style keyboard. Features: Auto dup, two-pass verification, constants, auto format change table lookups, range checks, batch totals, dup key full screen paging and much more. Easy format generation. Free 30 day trial period. Only \$295.

COMPUTER KEYES  
6519 893 SW  
Lynnwood, WA 98036  
(206) 778-6443

## SOFTWARE

### DATA MANAGEMENT

#### PC-FILE III™

New for 1985, version 3.0, is faster than ever. Enhancements: 32,767 record capacity, field size up to 1665 bytes, instant "snapshot" mailing labels, much more. Exchange data with 1-2-3, WORD, WordStar, etc. Over 100,000 copies of PC-File in use. Printed manual. \$49.95 each. M/C or VISA. Toll free 24 hours order line 1-800-JBUTTON.  
BUTTERWORTH  
PO Box 5766  
Bellevue, WA 98006  
(206) 746-4296

#### GENERAL MULTIKEY SEARCH

Fast search on a file of objects with any number of search keys. User enters LISTS OF KEY VALUES. Objects matching a list are its LIST SET. Program EVALUATES the UNION or INTERSECTION of ANY NUMBER of LISTS SETS, or their COMPLEMENTS. File structure: two variable-width fields, CODE and KEY VALUE. DBASE III, \$35.

Tom Lewinson  
392 Central Park West, Apt. 12X  
New York, NY 10025  
(212) 222-5550

## SOFTWARE

### DEVELOPMENT TOOLS

#### DEVELOPMENT SOLUTIONS

Use your PC as a complete development system. Cross-assemblers target most popular chip families. Debug with AYSIM full-screen simulators and TRACE in-circuit emulators. Turn your code into firmware with superfast ROMPRO EPROM programmers. Available for CP/M-86, CP/M-88, PC-DOS/MS-DOS host systems. Priced from \$200. Call for details.

### AVOCET SYSTEMS INC.

Avocet Systems Inc.  
PO Box 490-G  
Rockport, ME 04856  
(800) 448-8500, (207) 236-9055

#### ROMable CODE ON PCI

PCLOCATE allows PC users to develop ROM-based software from MS-DOS "EXE" files. The user specifies the physical location of all segments. Output files are compatible with most ROM programmers. PCLOCATE supports the 8086, 8088, 80186, 80188, and 80286 processors. MC/VISA. ALDO SYSTEMS, INC.  
PO Box 37634  
Phoenix, Arizona 85069  
(602) 466-1766

#### TURBO FORMS

Ensure user's input is correct before it reaches your Turbo Pascal program. Trial user input like data record I/O. Unlimited character and field level data checking, simple one step form creation/modification. Flexible formatting with graphics, windows, colors and display attributes. IBM PC or compatibles. \$39.95 including S&H/MC/VISA or C.O.D.  
GREAT LAKES SOFTWARE  
2510 Capitol Ave., Southwest Suite 263  
Bartle Creek, MO 64015  
(616) 952-2017

#### DBASE DEVELOPMENT SYSTEM

Professional Development Systems for dBase II & III. 1/2 mb of source, utilities, & programs for quick & creative application development. \$195. dBase programmers' editor, window manager, windows, let you edit up to 4 command files on screen, complete w/powerful source development features. \$245.  
GLOBAL TECHNOLOGIES CORP.  
16572 E. Louisiana Drive  
Austin, CO 80017  
(303) 337-7758

## SOFTWARE

### EDIT

#### LI! Jake

So Long EDIT! Hello LI! Jake!  
A Command-Free Full-screen Editor for IBM PCs and compatibles. A productivity tool for data entry and modification of text files. Fast and functional for the GP professional. Easy to learn for the novice, comprehensive on-line help facility. \$49.95 + S&H.  
Fooks Mathewson Company  
PO Box 2624 (Doe-24)  
Arlington, Virginia 22202  
(703) 684-6204

## SOFTWARE

### EDUCATIONAL

#### THE FUTURE IS NOW

MOTHER GOOSE—New generation revolutionary software for young children. Brilliant color graphics, animation and lively music. Invites computer & reading skills & child proof. Electronic page turning allows your child to experience the wonders of Mother Goose. It's fun, IBM PC/XT & PCjr. Tandy 1000 (294K) \$34.95 \$2.50 S/H. VISA/MC.  
SUNSTAR SYSTEMS  
Route #4 Box 368  
Opersburg, NY 13669  
(315) 363-7117

# BLUEBOOK

## SOFTWARE

### ENGINEERING

#### ENG/SCI GRAPHICS

**DMNPLOT(S)** (screen graphics) & **DMNPLOT** (plotter driver) provide integrated engineering/ scientific 2-D & 3-D graphics with NO PROGRAMMING REQUIRED! Menu-driven, flexible professional choice of formats: tabular/line, contour, bar, pie 3-D wire frame & much more! **DMNPLOT(S)** \$195, **DMNPLOT(P)** \$195. Both \$205.

#### MICROCOMPATIBLES

301 Prelude Drive  
Silver Spring, MD 20901  
(301) 583-0683

#### NEW STRUCTURAL DESIGN

Efficient, versatile structural analysis and design program in spreadsheet format—**BEAMS, COLUMNS & FRAMES** of data matrix. Friendly input and output with data storage and color graphics. **SPeCtRy PC**, XT or AT and send \$25 for demonstration diskette to:  
**C-Squared B-Squared Software Design Inc.**  
763 27th Ave  
San Francisco, CA 94121  
(415) 751-1333, (800) 621-0651

#### SIMULATION

**GPSS/PC** is a full-power version of GPSS, the most popular mainframe simulation language. More than just a language, it is a simulation environment specifically designed for interactive use on today's high-speed microprocessors. Using GPSS/PC, you can predict effects of changes to real-world systems.

#### MINUTEMAN SOFTWARE

PO Box 171-B, Stow, MA 01775  
1-(800) 343-0664 ext 4800 (U.S.)  
1-(800) 322-1238 ext 4800 (Mass only)

#### FREE CATALOG

Send for ASM's free catalog of engineering software for materials selection, graphics, finite element analysis, fracture mechanics, statistical data component design and more! All products backed by a 30-day money-back guarantee and ASM's 75 yrs as a publisher of technical information.

#### AMERICAN SOCIETY FOR METALS SOFTWARE

Metals Park, OH 44073  
(216) 338-5151

## SOFTWARE

### ENTERTAINMENT

#### STAR FLEET I

"I can STAR FLEET I the world's most elaborate star battles game!" — Jerry Proulx, Byte Sept 84. Features full color music, promotions! Capture ships, lay mines, launch probes, rescue bases, repair damage, eliminate invaders, more! 96 pg manual, Req 128K PC/PCjr 1 drive, 80 coins \$49.95 - \$2/s/h. Also for TI PC SANYO MB 555 (1924).

#### CYNIGUS

For CC orders  
PO Box 57825  
Wesley, TX 77598  
(713) 486-4163  
(in Illinois)

For CC orders  
(800) 622-4070  
(800) 942-7317  
(in Illinois)

#### ORIOSTAR 85™

Beat your boss or office pool with world's most sophisticated NFL analysis package. Verifiable 10-yr track record 64% win spread. Exciting, easy to use. 7-10 picks, 20 report pages weekly. \$150. We'll rush demo disk with Oristar manual for \$10. NBA Strategist™ inquire: VISA, MC Call 7-11 EST  
SUMMIT RESEARCH  
15666 Park Ave. Suite 806  
Toronto, Ontario M9P 2R7  
(416) 757-7796

#### THREE GREAT CARD GAMES

**CASINO BLACKJACK Counter/Tutor** teaches card counting and expert plays. **GIN RUMMY 4.0** plays a strong game, with regulation rules. **CRIBBAGE MASTER** plays and teaches, with discard suggestions. Card graphics. All well reviewed. \$35 each. \$60 any two. One drive 64K, 80 columns. VISA/MC. Free shipping.  
**MANHATTAN SOFTWARE**  
PO Box 765  
Petersborough  
NH 03408  
Orders Only  
1-800-432-5656  
Info/NH orders  
603-924-9998

#### LOS ANGELES ON A DISK

An adventure game with a touch of reality. A text and graphics game with over 250 points of interest from the L.A. area. It has over 20,000 words of text and over 120 sheets covering a 2000 sq mile area. Can be a one or two player game. Req 128K PC/XT, color graphics adapter. \$49.95.  
Klynes Engineering  
PO Box 1666  
San Valley, CA 93052  
(805) 526-3716

#### SFL FOOTBALL

Now you can have the thrill of football year round. Fantastic catches! Exciting interceptions! Goal line stands! These and more can all be yours while others only dream of them. Ideal for Christmas. Christmas Special \$29.95 - \$2.50. Requires 96K & 1 disk drive. For 1 or 2 players. Check MC or VISA.  
S.A.L.  
PO Box 54  
Shawnee Mission, KS 66201  
(800) 235-6646 ext 722  
in CA (800) 235-6647 ext 722

#### ANTIMATER 20

REAL TIME fast action arcade game. FULL 2 DIMENSIONAL MOTION and ROTATION. For 1 or 2 player ships and all objects. Head to Head play for 2 or GRAVITATIONAL effects. Top 10 scores on disk. Keyboard/Joystick. 90 difficulty levels. Practice modes. Game editor. Sound on/off. Pause mode. \$24.00.  
AFS/BMWARE  
PO Box 586  
Drexel Hill, PA 19026  
(215) 449-6875 Compuserve 72355, 1201

#### FOOTBALL FOL

"FOOTBALL FOL GAME" makes operating of pools fun again! It features:  
• 100 football sheets each week  
• Reports results after Sun and Mon games  
• 10 point spreads Mon points. Interstar Reviews IBM-PC or compatibles. Send check or M.O. to \$31.95 to:  
Crucis Choice  
PO Box 1381  
Pompano Beach, FL 33061  
(305) 752-4680

#### CRYPTOPUZZLES

For word puzzle enthusiasts! Solving cryptograms on a computer lets you have all the fun while the computer takes care of repetitive letter substitution. Choose from 5 categories with 500 questions in all! Plus, an infinite number of word arithmetic problems based on 20 phrases. \$22 - MA 5% tax. VISA/MC/CHK  
SUDSTAR!  
PO BOX 803  
FRAMINGHAM, MA 01701  
(617) 620-8315

## SOFTWARE

### FILE MANAGEMENT

#### BIBLIOGRAPHY FILING

**SEARCHJIT** version 3.0 cross references over 32,000 entries as bibliographies or full text. All text searchable. Download most national databases. Publication quality output no programming required. Any PC/MS-DOS. Special features for AT. Send \$10 for 2 disk demo. \$295. Citadel Software  
1595 Soquel Dr. Ste. 350  
Santa Cruz, CA 95065  
406-476-7106

## SOFTWARE

### GENERAL

#### SHOP CHEAP—EAT SMART

"LOUPORUM/MULR" Save more money with your discount coupons and rebates. \$4K.  
"DIET ANALYZER" Shows extra pounds! Tracks calories - 23 nutrients. Ideal for menu planning. 128 K. Immediate shipment. 2 week money back mail. \$49.95 ea. - \$2.50/s/h. AmEx, MC, VISA. Call for free brochure.  
NATURAL SOFTWARE LTD  
7 Lake St. Ste. 7  
White Plains, NY 10603  
(800) 625-2511, (914) 761-9323 in NY collect

#### CHIEFWARE™

Grammy (Word Game) - \$35 Draw Poker - \$35 Label Maker & Labels - \$45 Basic CREX - \$28 5-Year Diary - \$35 Tax Record - \$30 Poker Odds Calculator - \$25 Word List - \$20 Letter/Manuscript Writer - \$30 Basic Program Printer - \$20  
For DEMO send formatted disk & return postage.  
Robert L. Nicolson  
4038 E. North St.  
St. Louis, MO 63147  
800-NICOLAI (642-6524) in MO 314-621-7618

## SOFTWARE

### GEOGRAPHICAL

#### US-ATLAS

Locator of 32,000 cities. Fed & St Parks on Pre-coded disk. Color Graphics & Microchance. Great-Circle distance to any place on earth. 10 by 40 m/s map display. Locates all towns within a given circle. Has 5 options. MONEY BACK GUARANTEE. price \$39.95. Uses IBMPC, 192K, 1 disk drive. PC DOS 2.0 or later.  
ILLUSTON PC-PROGRAMS  
1930 Haysleton Dr.  
Jefferson City, MO 65701  
(314) 635-3417

## SOFTWARE

### GRAPHICS

#### 35mm SLIDE FROM YOUR PC

**COMPUTER SLIDE EXPRESS** converts graphic files produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monitor. Leave your printers behind. Use high resolution color slides all your file presentation. **COMPUTER SLIDE EXPRESS** \$6/slide. \$30 minimum order.  
VISUAL HORIZONS  
180 Metro Park  
Rochester, NY 14623  
(716) 424-5300

#### FORTRAM/PASCAL GRAPHICS

**GRAFMATIC** (screen graphics) 70 Microsoft/IBM 2.0 **FORTRAM/PASCAL** RM-PROF OR SS **FORTRAM** callable subroutines. Prof. graphics power backed up by a 100 pg. user manual. 5 packs in one gem utility. 2-interactive, total/2-D plot screen, 3-D plots, 3-D solid models (on-line removal) \$135. H-P/H-Plotter? By PLOTMATIC for complete plotter graphics capabilities. Interface w/GRAFMATIC \$135. Both \$240.  
MICROCOMPATIBLES  
301 Prelude Drive  
Silver Spring, MD 20901  
(301) 593-0683

#### GRAPHIC PRINTER SUPPORT

At last IBM-PC graphics support for your dot matrix printer. Use the PHSic key to produce quality B&W or color scaled dot matrix reproductions of your display on your Epson, IBM, Olivetti, IDS, Centronics, EIC, Aradex, Datacube, Gemini, TI 850, Hiernan, Toshiba, NEC 8023, or C. Itoh printers. If your printer is not listed, let us know and we will support it. **GRAPHPLUS** is now available for all IBM, PC or MS-DOS and will operate with IBM, Techni-matic, and Hercules graphics boards. Technologies inc. \$49.95.  
JEWELL TECHNOLOGIES, INC.  
4332 Southwest Alaska St. Suite 207  
Seattle, Washington 98115  
(206) 837-1081 1-800-628-2828 Ext. 527

## TURBO PASCAL & BASIC

Transfer IBM PC-compatible screen or window graphics to your Epson JX-80 color or Epson compatible graphics printer. Gives programmer control of resolution, color size & placement. This is not a Pk. Sc. routine, it's A PROGRAMMER'S TOOL. Specially Basic or Turbo. \$55 incl. source & shipping. Include check or money order and address. For info on additional features call or write to:

UNIVERSAL Software Systems, Inc.  
P.O. Box 1091  
Sellers Pt., WI 54481-8259  
715-345-2669

## LOW PRICE PAINT SOFTWARE

Wish to create full screen graphics but not spend for mouse system? Now, you can paint and design beautiful color graphic screens that can be printed or used in BASIC, with JOYSTICK JRPAIN. Fully menu driven. cut & paste circle, box, etc. PC, 4 colors. PCjr. 16 colors. \$29.95. Reg. Joystick, 1 drive BASIC. K&D COMPANY  
263 MARINE DRIVE  
SAN FRANCISCO, CA 94127  
415-334-6774

## INTERACTIVE FLOWCHARTER

Interactive EasyFlow: a full screen graphics program for flow & organization charts. Very powerful. 3 levels of zoom, automatic line routing, automatic text centering, horizontal & vertical scrolling. 18 std. shapes, user defined shapes easily added. full manual. Requires 256K and graphics adapter \$149.95.  
HavenTree Software Limited  
P.O. Box 1093-F  
Thousand Island Park N.Y. 13692  
(613) 542-7270 Ext. 50

## GENERIC CAD FOR YOUR PC.

SUPPORTS: Layers, Linetypes, Multiple Fonts Color Editing, User Defined Screen and Digitizer Menus, Rubber Banding Windows, Most Popular Mice. Digitizers & Plotters  
ORDERS & INFORMATION—CALL 1-800-228-3601  
Generic Software, Inc.  
6 Lake Bellevue #203  
Bellevue, WA 98003  
(206) 462-1944 1-800-228-3601

## EXECUTIVE PICTURE SHOW

Stop! Before you take an expensive look at GraView, Picture Pack, ExecuVision, or any other graphics package, shouldn't you take a look at the free, true, drawing/presentation graphics packages that do more? Give us a call or write us for information about Executive Picture Show and PCzation. \$15 Trial Versions available.



PCSOFTWARE  
9120 Gramercy Or. Ste 416  
San Diego, CA 92123  
(619) 571-0981

## SOFTWARE HOBBIES

### ROOTS II FOR PC GENEALOGY

Organize your family tree and print camera-ready family books, containing charts, text and indexes. Store, retrieve and display 1,000's of family facts with biographical sketches and source documentation. Lightning-fast searches and sorts. Display pictures and maps. 250 page manual. Satisfaction guaranteed. Write for free brochure \$195 (1-CA tax).  
COMASOFT  
2251 Del Middlefield Way Ste A  
Mountain View, CA 94043  
415 967-1900

### FAMILY TREE

Record your family history without forgetting the family budget. Trace 10 generations of ancestors or pedigrees. Record day, anniversary, family info. Totally menu driven. Requires IBM PC or comp. 1 floppy disk, printer, 128K DOS 2.1 or later \$59.95-\$3 shipping—VISA, MC or check.



SYSTEMS CONSULTANTS, INC.  
P.O. Box 37076  
Raleigh, NC 27627  
800-334-0854 Ext. 508 NC-919-846-1763

### SPOT COMET HALLEY—\$52

The heavens at your command. PC PLANETARIUM, one brilliantly conceived, meticulously executed, easy-to-use software package. ★ Draw a sky map for any location, date and time. ★ Include stars, planets, sun, moon, and Comet Halley. ★ Identify constellations and all objects. ★ Print a high resolution sky map.  
LIGHT Software  
369 Pine St. Mezz. Drawer B  
San Francisco, CA 94104  
(415) 788-4578

## SOFTWARE INVENTORY

### The StockRoom

A stand alone program. Ideal for retailers or wholesalers. Some features are add: change or delete from stock. Calculate reorder points. Sorted printouts with ave. cost, ave. sale, gross profit and margins and more. \$89.95. Free trial sheet.  
863 Systems Development  
P.O. Box 126  
Seneca Falls, New York 13148  
515/566-6165

## SOFTWARE INVESTMENT

### QUANTITATIVE INVESTMENT SOFTWARE—

5 quantitative valuation models, cash flow analysis, diversification index, what-if testing, security search, tax planning and total portfolio accounting. 9 client presentable reports. Single or multiple portfolio management. IBM/PC, AT, XT and compatibles. \$295.00 Master card/Visa. DUANT IX SOFTWARE  
5900 N. Port Rd. 146-A  
Milw. WI 53217  
(414) 961-1991

## SOFTWARE LANGUAGES

### BETTERBASIC

- Structured language with BASIC Syntax
- Extensible—Create your own keywords
- Modular—Procedures can be grouped together into library modules for higher productivity
- Utilized full PC memory capacity (640K)
- Full support for graphics, communications, and screen formatting. \$99. 6807 module \$99.
- Runtime System \$250. sample \$10.
- Summi Software Technology Inc.  
P.O. Box 99 Babson Park  
Wellesley, MA 02157  
(617) 235-0729 1-800-275-5800

## SOFTWARE MAILING PROGRAMS

### MY-T-MAILER™ \$30

Use users love this sturdy menu-driven worker. Secretaries say "Termin!" Print labels. 3 x 5 cards, envelopes, any format. Customized labels with line-by-line printer fonts. Sort, Search & Select with powerful, flexible, easy-to-use interface. EZ Browse Edit, & Delete. Print up to 5000 copies of one label. Also PCjr. Reg. 129K. \$30.  
JOHNSON SOFTWARE COMPANY  
P.O. Box 16507 Dept 3  
Seattle, WA 98116  
(206) 935-4861

### POSTAGE SAVING SOFTWARE

Process 1st, 2nd and 3rd Class mail according to U.S. Postal regulation to achieve the lowest postage rates.  
\* First Class—17¢  
\* Second Class—15¢  
\* Third Class—8-34¢ Nonprofit—3-4¢  
PostOffice automatically adds carrier route numbers, sorts and prints addresses in package and sack/day making order prints bag tags, Hay labels and calculates postage. Works with ASCII files, dBASE, and other popular data bases. IBMPC & equiv. \$195. Demo available.  
PostalSort, Inc.  
2115 Sunrise Dr.  
LaCrosse, WI 54601  
608-788-8011

## SOFTWARE MANUFACTURING

### MYTE MYKE™ MANUFACTURING Control System

Integrates with Business System. Std cost provides Bill of Material, operations routing, where used, same as except & protection capabilities. Inv. Control Forecast/Sched. MRP, MPP, Prod Cost, Prod Orders, Shop Floor Control, Install & support avail. PCDOS, MSDOS, NOVELL Networks, XENIX & UNIX.



M & D SYSTEMS, INC.  
3885 N. Buffalo Rd.  
P.O. Box 108  
Dichard Park, NY 14127  
(716) 662-6611

### MCBA MANUFACTURING SYSTEM

Designed to be flexible for use in job shop or repetitive environment. Over 15,000 users. Inventory Management, B.I.L. of Materials, Order Processing, Purchasing, Job Costing, Shop Floor Control, MRP, Product Costing and Routing, Labor Performance, Accounting, MS-DOS, XENIX, UNIX. Dealer inquiries accepted. Source available.  
MCM SYSTEMS INC.  
P.O. Box 792  
Southfield, MI 48037-0792  
(313) 535-0200

### TWIN OAKS mpr 2

- 12 Modules
- Inv. Control
- Purchasing
- MRP & CRP
- Master Sched g
- Phys. inventory
- Std Costing
- TWIN OAKS, INC.  
Box 136  
Collingswood, MN 55016  
(612) 458-1604
- 128K PC, XT or AT
- DOS, 1.0-3.0
- Hard/Soft Disk
- Online—Realtime
- Multi User
- Accy

## SOFTWARE MEDICAL

### PDS/1™ Version 5.0

COMPREHENSIVE MEDICAL BILLING, A/R & MANAGEMENT SYSTEM FOR IBM PC. Balance forward or open item. Single multi-entries. Aging revenue analysis, graphs. Day sheets, recall, referring physicians & add-on industry. Electronic claims. Customizable procedure & Dr code. Single or multiusers (local area network). Menu driven on-line help & fullscreen data entry. \$2500. FREE one year support and upgrade.  
Chen Information Systems Inc.  
3150 Almaden Expressway Suite 243  
San Jose, CA 95118  
(408) 723-2433



## BLUEBOOK

### MEDICAL SYSTEMS WITH ECS

All FPM products have electronic claims submission (ECS) to Medicare & commercial carriers, paper claims too.

- PC • CLAIM \$89.95, claims only
- PC • CLAIM w/CD's, CPT's & HCPC codes \$229.95

- PC • CLAIM PLUS claims only w/patient file. Complete a claim in one minute \$499
- THRESHOLD • TM \$1,995.00 claims, A/R patient billing

- THRESHOLD \$3,995.00 claims A/R patient billing, complete practice management, statistics, analysis

- CLAIM • NET Nationwide claims clearing house. Full 100% credit on product update
- PC • CLAIM • PC • CLAIM PLUS both house 30 day money-back guarantee. IBM PC/XT/AT/compatibles MS-DOS 256K

Physicians Practice Management  
1810 South Lynhurst Suite D  
Indianapolis, IN 46241

(317) 246-0357  
In continental U.S. call (800) 428-2515  
Indiana residents call (800) 792-3525

## SOFTWARE

### NETWORKING

#### THE SOFTWARE-DRIVEN LAN

LANLink™ is a revolutionary, software-driven network that's 1/10th the cost of board-driven LANs. It uses inexpensive serial ports instead of network boards. 99% of PC-DOS software is fully compatible. The \$495 Starter Kit includes network software PLUS cable for both a server and a satellite. Additional satellite modules are only \$195.



THE SOFTWARE LINK, INCORPORATED  
8601 Dunwoody Place, Suite 632  
Atlanta, GA 30338  
CALL (404) 998-0700

## SOFTWARE

### ONE OF A KIND

#### SUBLIMINAL MESSAGES!

"Encourage" "Motivate" "Change Habits" Sublime™ lets you flash subliminal messages on your PC screen. Sublime™ is memory resident & works on you while you work with other programs. Easy, interactive full screen pops up at any time with one keystroke. Special offer: All subscribers Nerdoc Pocket Protector "FREE" Sublime™ \$34.95



Nerdoc™

"Not back to the other guys back."

NERDCO  
335 Flower Street  
Costa Mesa, CA 92627  
(714) 650-7349

## SOFTWARE

### PERSONAL

#### BOOT UP YOUR RESUME!

Send your resume out on disk for a unique, high impact impression! THE RESUME DISK offers standard resume form plus in-depth information at a keystroke. Now you can customize, update, and distribute your resume on THE RESUME DISK. IBM PC and compatibles. 128K/two drives. \$39.95 Checks, Visa/M.C. MY LOOKOUT SOFTWARE  
P.O. Box 26598  
Cincinnati, OH 45226  
(513) 871-5222

## SOFTWARE

### PROCUREMENT

#### EXPERT CHOICE™

Use EXPERT CHOICE to make better procurement decisions. Include as many criteria as required such as cost, corporate image, delivery time, service level and resources. YOU make the judgments and EXPERT CHOICE will integrate them for logical and verifiable procurement decisions. \$495 DEMO DISK \$10.



Decision Support Software, Inc.  
1300 Vincent Place—Dept. P  
McLean, Virginia 22101  
(800) 368-2622 (703) 442-7900

## SOFTWARE

### REAL ESTATE

#### EZ-RE INVESTOR TEMPLATES

Complete analysis package for the Real Estate Investor. For Equity Share, Rent House, Apartments, Warehouses, and Office Buildings. Five mortgages can be ARM, FINA245, amort, deferred int. or int only. Ten year projection of cash flow, deductions, sell price, tax at sell, gain or loss per year, and after tax IRR. Expenses, int. rent, and appreciation adjust annually. Also 45 year loan amortization templates. Prof report. Requires LOTUS 123 and 256K. \$50 PPD. Money back guarantee. Visa, MC.  
LB ASSOCIATES, INC.  
8817 Spiker Lane  
Vienna, VA 22180  
(703) 936-9093

#### PROPERTY MANAGEMENT

Comprehensive program for managing residential and commercial properties. Many management reports including operating statement, delinquent rent, lease expiration and transaction register report. Provides check writing, check reconciliation, posting of late fees, recurring expenses—\$395 Investment Analysis—\$245

Yardi Systems  
3324 State St., Suite "D"  
Santa Barbara, CA 93105  
805-687-4245

### THE REBOS ASSOCIATE™

Performs buyer qualifications, amortization schedules, prospecting, financing, past customers and investment analysis. For IBM compatibles, 256K, single floppy. \$129.00

Clover Data Systems, Inc.  
541 South Broad St.  
Lansdale, PA 19446  
1-800-445-7600

## SOFTWARE

### SCIENTIFIC

#### MATRIX 100

Powerful Matrix operations with single statements in IBM PC BASIC. Perform multiple regression, solve simultaneous equations, invert matrices, etc. MATRIX 100 commands are fast, reliable and easy to use. Price \$80. 8087 support \$125. Compiler support \$250 (\$84 shipping & handling. CA res. add 6.5% tax.)  
STANFORD BUSINESS SOFTWARE, INC.  
4151 Middlefield Rd., Suite 215  
Palo Alto, CA 94303  
(415) 424-9499

## SOFTWARE

### SECURITY

#### BIT-LOCK™ SECURITY

Guard your valuable software from PRACY. Our innovative security system protects you from lost profits. Copies will only operate with a BIT-LOCK device attached. BIT-LOCK's powerful multi-layered security has proven its effectiveness on IBM PC/XT, TRS-80, Apple and Commodore computers thru the test of time.  
MICROCOMPUTER APPLICATIONS  
7805 So. Wilderness Circle  
Littleton, CO 80120  
(303) 922-6410

#### SECURE AT/XT/PC

Control system access, data access! FORTIS. Control system lock for most popular XT/PC hard disk controllers. Measure for AT and XT-compatible. 40 controllers segments hard disk by volumes, controls access with passwords, supports hard disk expansion \$80-\$130 + \$3 shipping plus CA tax.



GOLDEN BOW SYSTEMS  
P.O. Box 3039  
SAN DIEGO, CA 92103  
619-298-9349

### PASSWORD CONTROL YOUR PC'S

PC LOCK allows file by file password and encryption protection. With the lock in place, your computer will not boot without entering a correct PW. Ideal for small multi-user environments. A 5" x 4" card with diskette, 16 changeable passwords. Three versions from \$149. DES optional. KEEP YOUR PC STRICTLY PERSONAL.



MPP, LTD.  
2200 Lehigh Rd.  
Glenview, IL 60025  
(312) 996-6401

#### \$20,000 REWARD OFFER

Backs the CRIPTOR Encryption Package, paid if encrypted test file (comes with package) is broken. CRIPTOR secures text or data on disk or over modem. Works with all communications software. Non-DES proprietary algorithm. Optional output as Intel code groups. PC/MS-DOS, \$39.95 and send for information.  
Numerical Recurses Software, Dept. PH  
P.O. Box 243  
Cambridge, MA 02238

## SOFTWARE

### SORT

#### OPT-TECH SORT/MERGE

Extremely fast Sort/Merge programs for the IBM-PC, XT/AT. Can sort or merge multiple files containing fixed or variable length records. Run as a DOS command or call as a subroutine, plus many other features. Now also sorts BITREVE and dBASE II! Merge! Compare! You buy any other. Write or call for more info. \$99.  
OPT-TECH DATA PROCESSING  
P.O. Box 678  
Zephyr Cove, NV 89448  
(702) 566-3737

#### SORTX

A flexible, general purpose select/sort/merge facility which provides you with the ultimate in performance & reliability. Runs via menu, control file and command line. Supports text, sequential and random file formats. Supports character and numeric data types. Output file can contain full records, bytes, addresses, or keys. Imposes no practical limitations on number or size of records and keys. Allows records to be chosen selectively. Can sort in both ascending & descending orders. Can merge previously sorted files. Provides progress report, console logging, and comprehensive error handling. Price \$100.  
System Corporation  
19715 Gravina Street  
Rowland Heights, CA 91748  
(714) 594-7620

## BLUEBOOK

### SOFTWARE SPREADSHEETS

#### 123/SYMPHONY USERS

Comprehensive, flexible application templates designed for the experienced or novice user.

- Business Package (22 Applications) \$49.95
  - Business Accounting, Forecasting Tools, Dep. Schedules, Productivity Tools, Real Estate
  - Personal Package (10 Applications) \$19.95
  - Budgeting, Scheduling, Rental Property, Network, 30 Day Money Back Guarantee, Both
- Page \$59.95
- WestPointe Software  
733 River Drive  
St. Louis, MO 63088  
(314) 225-4226

### SOFTWARE STATISTICS

#### SIGSTAT

SIGSTAT includes over 70 programs of the BMD statistical series, plus many advanced new features. Mainframe capacity (up to 80 var.) for uni- (e.g., ANOVA, regression) or multivariate (e.g., canonical, factor) analyses, time-series, multidimensional scaling, cross-tab. plots, g/c and more. 8007 support opt. 256K. DOS. \$595.

**SIGNIFICANT STATISTICS**  
3336 N. Canyon Road  
Provo, UT 84604  
(801) 377-4860

#### RATS Statistical Package

RATS brings powerful and inexpensive statistical and econometric computing to the PC. It is a fast, accurate package that performs regression analysis, time-series forecasting, including Box-Jenkins, and cross-section analysis, including logit and probit. RATS can read data in many forms, including Lotus 1-2-3 files. RATS also offers programming features that provide maximum flexibility and power. Spectral analysis and graphics are available as options. Requires 256-K RAM. IBM or compatible. Base program: \$200. Demo including 300 page manual \$40. MC/VISA.

VAR Econometrics  
134 Prospect Ave. S.  
Minneapolis, MN 55419  
(612) 822-9690

#### STATISTICS CATALOG

If you need statistics for IBM PC or APPLE II, call us and let our technical advisors help you find the statistics programs you need. Write or call to get a FREE catalog of statistics software.

HSD  
9010 Reseda Blvd. Suite 222  
Northridge, CA 91324  
1-800-451-3030(NAT) 1-818-993-8536 (CA)

#### THE SURVEY SYSTEM

An easy to use, menu driven system for the entry, editing, processing and presentation of questionnaire data. The system can produce cross-tabs and scores in banner format, statistic and bar charts. Tables and charts are camera-ready for professional presentation. Card readers and open-end coding/analysis options available.

#### CREATIVE RESEARCH SYSTEMS

1648 Del Oro Drive P  
Palo Alto, CA 94352  
(707) 765-1001

### SOFTWARE

#### STOCK ANALYSIS

#### INCREDIBLE BUY!

Manage your portfolio like a professional for just \$99.95. With NET WORTH you will receive capabilities and performance usually only found in systems costing hundreds of dollars more. Take advantage of our 30 day money back guarantee or let us send you our free brochure. (For the IBM PC/XT/AT and compatibles with 256K, 128K version available for \$59.95), plus \$5.00 shipping and handling charge. Visa and MasterCard accepted.

Bulfinch Investment Software  
PO Box 853  
Manchester, VT 05603  
(817) 473-0248, (800) 433-3605

### SOFTWARE TAXES

#### TAXTIME™ FOR 1-2-3™

IRS & State approved tax preparation and planning templates for use with Lotus 1-2-3. Highly integrated, flexible, fast, and easy to use. Far surpasses all other tax spreadsheets. Uses 400,000 Corporate 1120 (320K) 1195 (\$75) Partnership 1065 (265K) 1195 (\$75) Cash 540 (256K) 1195 (\$45) New 5 year planners plus states 1040 (320K) 1195 (\$75) 1120 (512K) \$295/\$95. Coming soon: Federal 1041 plus NY, NJ, IL, AZ. Call toll free for detailed catalog.

Austin Scientific Inc.  
1259 El Camino, Suite 260  
Menlo Park, CA 94025  
USA (800) 227-3900  
CA (800) 632-2122

### SOFTWARE TERMINAL EMULATION

#### THE IMPERSONATOR

The most flexible terminal emulation program. User can modify one of the 12 emulations contained in the package: VT100, IBM 3101 & TV 550 or custom design additional ones with the built-in communications "language." Virtually unlimited asynchronous capability. For the IBM PC and compatibles. \$245 + s&h. MC/VISA/COD 1-800-443-8080

## DIRECT.AID

#### DIRECT.AID, INC.

PO Box 4420  
Boulder, CO 80306  
(303) 443-8008

#### MicroGate BSC EMULATION

Our MicroGate family offers complete BSC emulation. MicroGate/WS provides both remote 3270 & RJE links. MicroGate II is a programmable BSC subsystem to COBOL, C, BASIC, etc.; MicroGate 2780/3780 is now the standard to which other PC RJE links are compared all come with our unequalled customer support.

GATEWAY MICROSYSTEMS  
9501 Capital of Texas Highway, Suite 105  
Austin, TX 78759  
512-345-7791

#### BARR/HASP INTELLIGENT RJE WORKSTATION

Bundled hardware and software for IBM PC, XT and AT. Transmits data to host and receives output simultaneously. Emulates IBM 3777-2 and HASP on IBM 360/20 Line speed 300 to 15000 Baud (15 Kib on AT). Supports multiple high-speed printers beyond 2400 lpm (7000 lpm on AT). Features: menu-driven, printer farms control, plotter support, unattended operation, easy installation. \$890 complete.

BARR SYSTEMS, INC.  
Suite M, 2830 NW 41st Street  
Gainesville, FL 32606  
(800)-BARR-SYS/(904) 371-3050

### SOFTWARE TRAINING

#### YOUR KEYBOARD GOTCHA?

Don't miss the benefits of Dvorak another day. Sure Stroke/Dvorak gives you sophisticated keyboard translator for DOS applications, superb Dvorak typing Coach, self-motivating audio cassette, transfer letters, keyboard puffer, manual \$95.00 plus \$4.00 shipping. VISA/MC, AMEX, check. You can stroke the Dvorak today!

Seasonal Systems, Inc.  
Box 3720  
Chapel Hill, NC 27515  
(800) 334-5531 (919) 732-9391

### SOFTWARE TYPESETTING

#### HIGH-TECH TYPESETTING

Transfer your text via toll-free lines directly to our fully automated typesetting system. \$2 per K characters with a \$5 minimum. Same day service. 200 typesets in sizes up to 72 point. Send \$15 + \$3 shipping for our 220 page guidebook, or call toll free and use your MC, VISA or AMEX.

INTERGRAPHICS INC.  
106A South Columbia Street  
Alexandria, VA 22314  
(800) 368-3342 or (703) 683-9414 in DC area

### SOFTWARE UTILITIES

#### PADLOCK/PADLOCK II DISKS

PADLOCK furnishes the user with a method for providing protection against unauthorized duplication from DOS commands \$99. PADLOCK II disks come preformatted with large-print and serialization. PADLOCK I disks offer superior protection. Ask about our PRIVATE TALK product. All work with hard disk, EIDE/COM lines and all DOS versions. MC/VISA.

GLENCO ENGINEERING  
3620 Ridge Ave  
Arlington Hts., IL 60004  
(312) 382-2492

#### SCREEN MANAGEMENT SYSTEMS

SMS is simply the best utility available for designing, using, and saving color/monochrome screens. GOSUR's are supplied in BASIC to in-out, output, and edit screen data fields. Loads of extra features. We have been in business 15 years, winning many awards for programming excellence. Price \$195, demo \$50, Manual \$10.

VISA/MC, PC/XT/PC II, 164K/1 Disk  
DMA SYSTEMS, INC.  
PO Box 1424  
Saginaw, MI 49605  
(517) 783-0185

#### COPY II PC

Copy II PC is the backup insurance you need to protect your software investment. Copy II PC makes floppy backups of most protected software quickly & easily, and even allows several to be run from a hard disk without a floppy in AT. (Call for current list.) For IBM PC, XT, AT, 256K. Also available for Apple II, MC, C64. \$39.95 + \$3 s/h VISA/MC/Check.

*Central Point  
Software*  
UNLIMITED

CENTRAL POINT SOFTWARE, INC.  
9700 SW Capitol Hwy., #1008  
Portland, OR 97219  
(503) 244-5782

## PEEK'S 'N' POKES.... and more!

Thousands of programmers enhance their programs and save time with PEEK'S 'N' POKES! The disk (58 programs) & manual show you how to access and modify system status, perform DOS & BIOS functions like BASIC or Pascal, and much more for only \$30. Want more? A perfect companion package, THE INSIDE TRACK, gives you programs assembler-assisted speed plus control over the keyboard, memory, programs, etc. Disk (61 programs) & manual for just \$45. Shipping \$2.50/order. MC/VISA.

DATA BASE DECISIONS  
14 Bonnie Lane  
Atlanta, GA 30308  
(404) 256-3860 (800) 722-7006

## FAST, SMART XT BACKUP

BACKUP™ does daily backups in less than 5 min, a full (10MB) backup in less than 30 min. Uses floppy disks, cartridge disks, etc. on XT, AT or compatible. Unique catalog of backed up files includes restoration & prints backup reports. Includes 50 cassette labels. 30-day money-back guarantee. \$179.95, Visa, MC, PO or C.O.D.

# Bakup

SOFTWARE INTEGRATION INC.

For more info: 213-776-3404  
To order: (800) 538-6157 Ext. 801 (USA)  
(800) 672-3470 Ext. 801 (Can)

## Hard Disk DIRECT ACCESS™

THE ULTIMATE utility for any hard disk user. DIRECT ACCESS is a powerful hard disk management tool. Organizes your software programs into a "user defined" menu system. Features attractive screen display, rapid access into an application using a single keystroke & easy to learn. Also handles batch files & complicated DOS commands. Order today! Only \$59.95 + \$3.00 shipping. MC/VISA.



DELTA TECHNOLOGY

DELTA TECHNOLOGY INTERNATIONAL INC.  
PO Box 1104  
Eau Claire, WI 54602  
(715) 832-0958

## MENU SYSTEM MANAGER

Professional system management via USER CREATED MENU. Invoke any DOS command or program Name (e.g. COMBAT) with PASSWORD SECURITY AUTOMATIC LOG for any menu entry stores Date, Time, User Id. Command invoked. Purpose of Access. Menu contains no commercial information. (makes YOU look good) \$129.00 MC/C, VISA, CH. GURDAM Software Development  
158-B Merivale Ave.  
West Patterson, NJ 07424  
(201) 785-2498

## dWINDOW™

Learn 9K assembly language program adding 25 new assembling SYNTAX statements to dBASE II

- User defined in-memory and disk-based, tree-structured WINDOW files
- Executable DOS command at prompt
- CAPTURE full/partial screen
- Create Menus with READ BAR capability
- Character Graphics
- Fully compatible with dBase II PRG files

Size: (IBM PC, XT or AT) (dBASE II vs. 2.4 or 2.1)

\$165.00 (\$4.00 shipping) check, MC or Visa

## LIBERTY BELL

SOFTWARE

LIBERTY BELL PUBLISHING

PO Box 63306 Dept A  
Portland, OR 97201  
(503) 231-1806

## FANSI-CONSOLE™

INTEGRATED CONSOLE UTILITY: speed up screen, scroll/scroll, more typeset, auto display screen, no scroll/bank some adapters, more X3.64 than ANSI, SYS. VT 100/52 keys, windows, keyboard breakpoints & macros. Recently reviewed in LOTUS "June 85 pg 8". Shareware disk \$25, or disk & 325 p. manual \$50 (M + 4% MC/Visa)  
Hershey Micro Consulting, Inc.  
Box 8276  
Ann Arbor, MI 48107  
313-994-3259

## KEYBOARD MAPPER

SOFTKEY™ allows user to redefine keyboard keys to other characters or character strings. Pictorial editor lets you see what keys have been redefined. Unlimited number of different keyboards can be made. For IBM PC's & Compatibles. Price \$49.95 + \$3 S/H. VISA, MASTERCARD, & CHECKS ACCEPTED.  
Troy Systems  
74 Northeastern Blvd  
Nashua, NH 03062  
(603) 883-0558

## EASY AIM-30 day trial

Installs your programs on a hard disk and creates subdirectories, paths, and displays programs in a menu, all automatically. Features include: time log, backup to floppy or tape, copy files, to/from floppies, to/from between menu user, Powerful yet simple \$84.95

LARSON SYSTEMS, INC.

Box 193  
STORY CITY, IOWA 52248  
(515) 733-2717

## askSam

A simple yet powerful-end user text oriented dms. Retrieve on any combo of words, parts of words and/or field values. Sort output to printer, screen and/or hold values with full screen text editor or batch operations. For IBM PC, PCjr, AT, XT & compatibles with PC-DOS 2.00 or later, 128K min. \$149.95 + \$3 S/H. VISA/MC.



Seaside Software  
538 Paradise Drive  
Corpus Christi, TX 78412  
512-991-2019 or 1-800-AskSam

## \$50 per Megabyte for IBM/XT

MCFORMAT software adds 15% to 50% to hard disk capacity by allocating space in smaller units than PC-DOS, thus wasting less space. PC/XT users get at least one Mb (386Mb hard disk users get up to 10Mb) more useful storage with fully compatible PC-DOS 3.0 or 3.1. \$50 prepaid including shipping. VISA/MC  
Microcomputer Concepts, Inc.  
9715 S.E. 43rd Street  
Merced Island, WA 98040  
(800) 722-8086

## SCROLL AND RECALL

A resident screen and keyboard enhancement utility. It captures the data that goes off the top of your display screen and allows you to scroll back through this data or save it to a disk file. Also saves your DOS commands as you enter them and allows you to recall, edit and re-enter previous commands without retyping. \$69.  
OPT-TECH DATA PROCESSING  
PO Box 678  
Zephyr Cove, NV 89448  
(702) 566-3737

## AT/XT/PC HARD DISK EXPANSION

Replace hard disk with a bigger one, or add a second drive! Virtually supports high-capacity drives on standard AT, XT, and compatible hard disk controllers. Includes multiple volumes, security features, selectable clusters, keyboard lock. \$80-\$120 + \$3 shipping + CA tax



GOLDEN BOW SYSTEMS  
PO Box 1038  
SAN DIEGO, CA 92103  
(619) 298-9349

## HP LaserJet Setup Utility

SETHP: a simple menu-driven and/or batch utility that allows full control over your HP LaserJet printer. Supports 11 font cartridges. Control margins, number of copies, lines per inch, lines per page, etc. Over 125 commands. Only \$49.95 + \$4 S/H. CHECK/VISA/MC. Now NETWORK compatible.



ORBIT ENTERPRISES INC.

PO Box 28715 M  
Glen Ellyn, IL 60138  
(312) 469-3405

## TurboPower UTILITIES

Nine Powerful Tools for Turbo Pascal users on PC/XT/AT & compatibles—Pretty Printer, Structure Analyzer, Execution Timer & Profiler, Pattern Repetitor, File Differencer, Command Repeater & more. See ads in Byte & PC Tech for more info. OS/2 disk & 130 pg manual \$55. With source code & theory \$95.  
TurboPower Software  
478 W. Hamilton Ave. #196  
Cambridge, CA 95008  
(800) 538-6157, x 630 (CA) (603) 672-3470

## II IBM USES CPM DISKS II

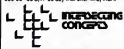
Ultimate lets you run CPM disks in your IBM 8 drive while running any DOS 2.0 program. Read and write to the CPM disk directly or convert files to IBM format. Over 70 formats, also 8" and 96 TP IBM PC, XT, AT. Call for details. Next day shipping. Dealers invited \$59.95 + \$5.50 H. No PO's. Uniform by Micro Solutions.  
BLUE HERON PUBLISHING CO.  
1108 South Second St.  
Durham, IL 60015  
(815) 756-7355

## MULTIPLE FONTS FOR EPSON

Print any text file in a variety of character styles and sizes using the DigCon Print Package. Create new fonts with its interactive char editor. Also prints sideways. Use for brochures, booklets, letters, even signs and banners! Quick printer setup utility too. Easy menu, online help. \$49.95 (M + 6% CH/MC)  
DIGITAL CONCEPTS, INC.  
POB 8345, Dept 8  
Pittsburgh, PA 15218  
(412) 623-8314

## MEDIA MASTER PLUS

Read, Write, and format over 60 CPM disks and run most CPM/M-80 programs on the IBM-PC/XT program package includes 2P/EM, a CPM-80 emulator programs that transforms your IBM-PC into a 1-2 mHz CPM/2.2 computer. \$59.95 + \$3 S/H. 60 day trial offer. MC/VISA.



INTERSECTING CONCEPTS, INC.  
4573 Heatherfield Court  
Moorpark, CA 93021  
(805) 529-5073

## SOFTWARE

## WORD PROCESSING

## PC-WRITE™

Features wordwrap, search/replace, justify, block move/copy/delete, headers/footers, etc. Help screen, quick ref card, 100 page manual. Split screen, edit two files at once. Disk with software and manual \$10; registration with support, source, and commissions \$75. Shareware can copy and share with others. VISA/MC. QUICKSOFT  
219 First North #224e  
Seattle, WA 98109  
(206) 282-0452

## MY WORD IS JUST \$35

Emulates vs. Fully Integrated, full screen word processor for IBM PC/XT/AT or compatibles. Wordwrap, search/replace, block ops, headers & footers, sort, adds row/columns, calculator, macros, merge-print, quick print, 256 CHARs. Allows color & customizing 1000+ ops, won't lose text, utilities, translate w/ files to ASCII or back. Help screen, printed manual (indexable of contents), fully supported. Source add \$35. DOS 1.1-3.0, 128K, 1 drive, use any printer. 30 day money-back guarantee!  
T.N.T. SOFTWARE INC.  
34069 Hainesville Road  
Round Lake, IL 60073  
(312) 223-0832

# What the world really needs is a 69 cent Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

## And DISK WORLD! has it.

**Introducing Super Star Diskettes:  
the high quality diskette with  
the lowest price  
and the best LIFETIME WARRANTY!**

In the course of selling more than a million diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette...no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent.)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality. The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits. But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

### How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers. Rather, they are fabricators or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and passing their labels on the finished product.

The new Eastman Kodak diskettes, for example, are one of these. So are IBM 5 1/4" diskettes. Same for QYSAN, Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices...without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications...specifications which are higher than most...and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.



5 1/4"  
**SSDD**  
\$.55 ea.  
Qty. 50

5 1/4"  
**DSDD**  
\$.69 ea.  
Qty. 50

Super Star diskettes are sold in multiples of 50 only. Diskettes are shipped with white Tyvek sleeves, reinforced hubs, user ID labels and write-protect tabs.

**Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years...without knowing it.**

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting. We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can...because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them...and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work time after time, everytime. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

**Super Star Diskettes. You already know how good they are. Now you can buy them...cheaper.**

Well, that's the story.

Super Star diskettes don't roll off the boat from Pago-Pago or emerge from a basement plant just east of Newhires.

Super Star diskettes have been around for years...and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Super Star diskette. And maybe more than once, you've bought a box or two or more of Super Star diskettes without knowing it. They just had some "big" company's name on them.

Super Star diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the millions.  
And then we sell them to you.  
Cheap.

### When every little bit counts, it's Super Star Diskettes.

You've used them a hundred times...under different names.

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy...and call their own.

We simply charge less.

### Super Special!

Order 50 Super Star Diskettes and we'll be happy to sell you an Amazym Media-Mate 50 for only \$8.75, shipping included a lot less than the suggested retail price of \$15.95.



Regular DISK WORLD! price: \$9.69 ea.  
+ \$2.00 Shpg.

### DISKETTE STORAGE CASES

#### DISK CADDIES

The original flip-up holder for 10 5 1/4" diskettes. Beige or Grey only.

**\$1.65 ea. + .20 Shpg.**

#### DISKETTE 70 STORAGE

Dust-free storage for 70 5 1/4" diskettes. Six dividers included. An excellent value.

**\$9.95 ea. + \$3.00 Shpg.**



### HOW TO ORDER:

**ORDERS ONLY:**  
1-800-821-6827  
(In Illinois: 1-312-256-7140)

**INQUIRIES:**  
1-312-256-7140

FOR FASTEST SERVICE, Use NO-COST MCI MAIL. Our address is DISKORDER. It's a FREE MCI MAIL letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

**SHIPPING:** 5 1/4" & 3 1/2" DISKETTES—Add \$3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add additional \$5.00 special handling charge. **APR, PPG, AK, HI & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover ins. and insurance. We ship only to United States addresses, except for those listed above. **TAXES:** Illinois residents, add 7% sales tax.

**MINIMUM ORDER: \$35.00**

### The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against defects in original material and workmanship so long as owned by the original purchaser. Returns are simple: just send the defective diskettes with proof of purchase, postage paid by you with a short explanation of the problem, and we'll send you the replacements. (Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective.")

**WE WILL MEET OR BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES SUBJECT TO THE SAME TERMS AND CONDITIONS.**

**629 Green Bay Road  
Wilmette, Illinois 60091**

**DISK WORLD!, INC.**

**HOURS:**  
Human: 8AM-6PM Central Time, Monday through Friday  
Answering Machine: 8PM-8AM, All Times  
MCI MAIL: 24 hours a day.

# Compuclassics

## SOFTWARE

### DATA BASE MANAGEMENT

**ALPHA SOFTWARE** Our Price  
Data Base Manager II 179.00

**ASHTON TATE**  
dBase III 369.00

**FOX & GELLER**  
QuickCode III 145.00  
QuickReport III 145.00  
qGraph III 145.00

**LEADING EDGE**  
Nutshell 79.00

**M.D.B.S.**  
Knowledge Men/2 295.00

**MICROPRO**  
InfoStar + 199.00

**MICRONIM**  
rBase 5000 359.00

Extended Report Writer 99.00

**MICROSTUF**  
Infoscope 125.00

**NANTUCKET**  
Clipper (dBase III Compiler) 409.00

### WORD PROCESSORS

**LEADING EDGE**  
with Merge & Spell 149.00

**LIFETREE**  
Volkswriter Deluxe 149.00

**MICROPRO**  
Wordstar 179.00

Wordstar Propak 249.00

Wordstar 2000 245.00

Wordstar 2000 Plus 295.00

**MICROSOFT**  
Word 239.00

**MULTIMATE**  
Multimate 219.00

**OVERON**  
Overon Omni-reader 639.00

**SAMMA**  
Samma Word III 249.00

Samma + 339.00

**SATELLITE SOFTWARE**  
Word Perfect 4.0 219.00

### INTEGRATED SOFTWARE

**ALPHA SOFTWARE**  
Electric Desk 189.00

**ASHTON TATE**  
Framework 369.00

**LOTUS**  
Symphony 435.00

**SOFTWARE GROUP**  
Enable 339.00

### SOFTWARE PUBLISHING

PFS Family

Write 89.00

File 89.00

Graph 89.00

Access 89.00

Plan 89.00

Report 89.00

Proof 60.00

**XANARO**  
Ability 285.00

### GRAPHICS

**DECISION RESOURCES**  
Chartmaster 239.00

Signmaster 175.00

**DIGITAL RESEARCH**  
Dr Draw 195.00

Gem Draw 95.00

**I.M.S.I.**  
PC Paintbrush w/ Mouse 129.00

**MICROGRAFX**  
PC Draw 249.00

**MICROPRO**  
Chartstar 149.00

**MICROSOFT**  
Chart 159.00

### PROJECT MANAGEMENT

**BREKTHROUGH**  
Timeline 225.00

**HARVARD SOFTWARE**  
Total Project Manager 245.00

**MICROSOFT**  
Project 159.00

**SCITOR**  
Project Scheduler Network 339.00

**SORCIM / IUS**  
Superproject 229.00

### SPREADSHEETS

**LOTUS**  
Lotus 1-2-3 309.00

**MICROSOFT**  
Multiplan 129.00

**SORCIM / IUS**  
Supercalc III Release 2 169.00

### COMMUNICATIONS

**HAYES**  
Smartcom II 95.00

**MICROSTUF**  
Crosstalk XVI 99.00

Remote 95.00

Transporter 145.00

**WOOLF**  
Move-it 89.00

### ACCOUNTING

**G.N.P.**  
C.P.A. + 359.00

**I.U.S.**  
All Modules 279.00  
Payroll 329.00  
Easy Plus 55.00  
**OPEN SYSTEMS**  
All Modules 339.00  
Business Basic Interpreter 165.00  
**REALWORLD**  
All Modules 399.00

### PROGRAMMING LANGUAGES

**FORLAND INTERNATIONAL**  
Turbo Pascal 3.0 35.00  
With 8087 59.00  
With 8087 & BCD 75.00  
Turbo Toolbox 30.00  
Turbo Tutor 19.00  
Graphix Toolbox 30.00  
**DIGITAL RESEARCH**  
C Basic Compiler 369.00  
**LIFEWORT ASSOCIATES**  
Lattice C Compiler 299.00  
**MICROSOFT**  
Fortran Compiler 229.00  
Quick BASIC 65 199.00  
Macro Assembler 99.00  
C Compiler 249.00

**UTILITIES**  
**FORLAND INTERNATIONAL**  
Sidekick 39.00  
Sidekick (Unprotected) 45.00  
Superkey 49.00  
**CENTRAL POINT**  
Copy II PC 25.00  
**DIGITAL RESEARCH**  
Gem Desktop 32.00  
**FUNK SOFTWARE**  
Sideways 35.00  
**PETER NORTON**  
Norton Utilities 55.00  
**QUADIX SOFTWARE**  
Zero Disk 55.00  
**ROSESOFT**  
Prokey 89.00  
**SIMON & SCHUSTER**  
Typing Tutor III 32.00  
**SOFTWARE ARTS**  
TK Solver 259.00  
**UNISON**  
Printmaster 32.00  
**WARNER SOFTWARE**  
Desk Organizer 59.00

**PERSONAL MANAGEMENT**  
**CONTINENTAL SOFTWARE**  
Home Accountant Plus 82.00  
**LIVING VIDEOTEXT**  
ThinkTrek 119.00  
**MECA**  
Managing Your Money 189.00  
**MONOGRAM**  
Dollars And Sense 129.00

**HARDWARE**  
**MONITORS**  
**AMDEK** Our Price  
Amdek 310A 159.00  
**PRINCETON GRAPHICS**  
Max 12-E 169.00  
HX-12 479.00  
SR-12 599.00  
Scan Doubler 179.00  
**PRINTERS**  
**EPSON**  
FX 80 Plus 369.00  
FX 100 Plus 489.00  
LQ 1500 919.00  
**NEC**  
2250 750.00  
**OKIDATA**  
All Models CALL  
**TOSHIBA**  
1340 579.00  
351 1275.00

**MEMORY AND MULTIFUNCTION BOARDS**  
**AST RESEARCH**  
Sopak Plus w 64K 235.00  
Adventure w 128K 399.00  
Megaplex II w 64K 265.00  
**GENOA SYSTEMS**  
Spectrum 339.00  
**HERCULES**  
Graphics Board 309.00  
Color Card 149.00  
**PARADISE**  
Modular Graphics Card 265.00  
Five Pack with 8 K 159.00  
**QUADRAM**  
Quadboard 64K 199.00

**MODEMS**  
**HAYES**  
1200 B 369.00  
1200 369.00  
2400 679.00  
**MISCELLANEOUS**  
**KENSINGTON**  
Masterpiece 89.00  
**KEYTRONICS**  
5151 Keyboard 175.00  
**MICROSOFT**  
Mouse 129.00

Call for prices on IBM computer systems and for any item not included in this price list.

**ADVANTAGES**  
• We welcome corporate accounts.  
• Free technical support.  
• Immediate replacement of defective goods.  
• Bulk discounts.

## HARDWARE

**MONITORS**  
**AMDEK** Our Price  
Amdek 310A 159.00  
**PRINCETON GRAPHICS**  
Max 12-E 169.00  
HX-12 479.00  
SR-12 599.00  
Scan Doubler 179.00  
**PRINTERS**  
**EPSON**  
FX 80 Plus 369.00  
FX 100 Plus 489.00  
LQ 1500 919.00  
**NEC**  
2250 750.00  
**OKIDATA**  
All Models CALL  
**TOSHIBA**  
1340 579.00  
351 1275.00

**MEMORY AND MULTIFUNCTION BOARDS**  
**AST RESEARCH**  
Sopak Plus w 64K 235.00  
Adventure w 128K 399.00  
Megaplex II w 64K 265.00  
**GENOA SYSTEMS**  
Spectrum 339.00  
**HERCULES**  
Graphics Board 309.00  
Color Card 149.00  
**PARADISE**  
Modular Graphics Card 265.00  
Five Pack with 8 K 159.00  
**QUADRAM**  
Quadboard 64K 199.00

**MODEMS**  
**HAYES**  
1200 B 369.00  
1200 369.00  
2400 679.00  
**MISCELLANEOUS**  
**KENSINGTON**  
Masterpiece 89.00  
**KEYTRONICS**  
5151 Keyboard 175.00  
**MICROSOFT**  
Mouse 129.00

Call for prices on IBM computer systems and for any item not included in this price list.

**ADVANTAGES**  
• We welcome corporate accounts.  
• Free technical support.  
• Immediate replacement of defective goods.  
• Bulk discounts.

**TERMS:** All prices subject to change. No surcharge for VISA or MasterCard. 2% surcharge American Express. No returns without RA#. Short shipments must be notified within 48 hours. 15% restocking fee on non-defective goods. \$5.00 C.O.D. charge. Shipping \$4.00 per item, less on bulk orders. (\$8.00 Blue Label).

1 818 705-1895 US  
1 800 231-6603 CA  
1 800 328-4473 US



Order desk & technical support open:  
9 a.m. to 6 p.m. Monday - Friday  
10 a.m. to 2 p.m. Saturday

6924 CANBY ST SUITE #118 RESEDA CA 91335

CIRCLE 205 ON READER SERVICE CARD



# GET FREE INFORMATION!

Of all the products advertised in this issue of PC Magazine, there are dozens you'd probably like to know more about. Handfuls you might be interested in buying.

Now you can have pertinent, comprehensive information about these products right at your fingertips, and it won't cost you anything. Only a minute of your time.

The manufacturers and distributors of these products have colorful and informative literature available. If you're interested in receiving these brochures, PC's Reader Service Program can help.

Simply follow the instructions described below and PC will forward your requests for information to the appropriate advertisers. Before you know it, you'll have a complete and handy product reference file.

While you are looking through PC Magazine take advantage of this handy flip-open card to

circle the numbers as you see products that interest you.

Getting free information about products advertised or mentioned in this issue of PC is as easy as 1-2-3.

**1.** Each ad in the magazine includes a reader service number. (These numbers are repeated on the advertiser index, as well.) If you'd like more information about the product or products described in a particular ad or feature, circle the corresponding number on the attached card.

**2.** Fill in your name and address in the space provided. Please: only one card per person.

**3.** Mail the card today ... it's postage paid. And watch your information file begin to grow.

NOTE: This card is to be used for product information or subscriptions only. Editorial inquiries should be directed to PC Magazine, One Park Avenue, New York, NY 10016.

Now is also an ideal time to become a PC subscriber. See the back of this card for details about our special offer for new subscribers.



**IF YOU ARE A  
PROFESSIONAL PC  
USER...**

**IF YOU SEE THE  
PC AS AN INVESTMENT  
OR IMPORTANT  
BUSINESS TOOL...**

**IF YOU WANT TO  
MAXIMIZE YOUR PC  
PRODUCTIVITY...**

**HERE IS A SPECIAL  
OFFER YOU WON'T WANT  
TO MISS!**

Now you can receive 24 biweekly issues of PC Magazine for only \$21.97—less than 92 cents an issue!

The money PC will help you save will cover the cost of your subscription more than ten times over!

How?

In PC Magazine, you'll find in-depth and thorough product reviews that will help you make informed and appropriate buying decisions.

You'll learn about innovative applications... project management, communications and graphics... and how to put them to use on your PC.

You'll hear industry news first-hand, and how forward-thinking professionals are using their PCs to further their business goals.

What's more, you get all this information every two weeks, giving you a decided edge over colleagues who rely on a monthly publication.

Your subscription to PC is your guarantee of the most up-to-date and comprehensive coverage of innovations and applications that will help you maximize the performance of your PC.

So don't miss out. Act now on PC's special offer and get 24 issues for only \$21.97. Fill out the attached reader service card and check the subscription box. Or, call toll free, 1-800-852-5200.





# PC Product Index

## RS# PRODUCT ADVERTISER PAGE#

### ACCOUNTING SOFTWARE

389	Accounting Software	Business Tools, Inc.	269
149	Accounting Software	DAC Software	17
263	Verba Business Series	H & B Computers	278
343	Accounting Software	In Home Software	76
168	Accounting Software	MCBS	76
388	A Budget	Jack Park Software	224
169	Real World Software	Real World Software	191
	Accounting for Macros	The James River Group	98

### INTEGRATED ACCOUNTING PACKAGES

470	eBASE II Accounting	SBT Corp.	25
-----	---------------------	-----------	----

### COMMUNICATION SOFTWARE

326	CrossTalk	Macro Staff Inc.	84
212	Remote	Macro Staff Inc.	187
215	Remote	Macro Staff Inc.	189
214	Remote	Macro Staff Inc.	191

### TERMINAL EMULATORS

250	TeleVision	PTG Data Systems	85
-----	------------	------------------	----

### GRAPHICS SOFTWARE

138	monOGRAHYX	Analyses International Inc.	223
366/67	DRG	Banner Blue	268
377	GraphWriter & Interlacer	Graphic Communications Inc.	196
376	GraphWriter & Interlacer	Graphic Communications Inc.	197
158	Graphics Soft	Hypergraphics	275

### INFORMATION MANAGERS

112	Pop-Up	Relsoft	229
-----	--------	---------	-----

### PROJECT MANAGERS

187	Project Planner	Pratemon Systems	205
-----	-----------------	------------------	-----

### OTHER INFORMATION MANAGERS

	The Little Black Book	Cybert Technology	217
--	-----------------------	-------------------	-----

### SOFTWARE FOR PROFESSIONALS

119	Home Base	Amber Systems	159
147	Super Key	Borland International	156-157
343	Drawing Tables-I Scientific Calculator	K. Software House	217

### WORD PROCESSING SOFTWARE

148	Whoppy! Real-Time Speller	Cortacopia	58
37	Write	XyQuest	212

### WORD PROCESSORS

385	Volunteer Deluxe	Lifescape Software	83
379	PC Writer	Quid Soft	130

### WORD PROCESSING AIDS

103	LaserPrint	Buba Software, Inc.	202
221	Polenta Print Merge	Soft Craft, Inc.	18
222	Fancy Font II	Systems Compatibility Corp.	296
222	Linkage	Systems Compatibility Corp.	296
222	Model 484	Systems Compatibility Corp.	296
222	W Link	Systems Compatibility Corp.	296
222	Text Com	Systems Compatibility Corp.	296
222	Software Bridge	Systems Compatibility Corp.	296

### MULTIFUNCTION SOFTWARE

374	Software	Easyt Inc.	277
248	E-Z DOS II	Hannover Computer Systems	61
146	Public Domain Software	PC Software Bureau Group	124

### TYPESETTING SOFTWARE

302	Le Print	Lehigh Software Corp.	104
	Personal Typesetter	Potomac Pacific Engineering	102

### EDUCATIONAL SOFTWARE

360	"Make The Grade" Educational Software	CBS Software	190
346	Duc Mechanic	MLI Microsystems	223
362	Northern Utilities	Northern Utilities, The	48
382	FIS Transfer	Personal Computer Products	48
	Copywrite	Quasi Software LTD	232
135	ATI 1000	America Int'l	232
155	ATI 2000	America Int'l	232

### IBM PC COMPATIBLE COMPUTERS

139	PC 486 & 286	Guifram Microsystems	238
204	MBC 715 Color Computer	Sanyo Business Systems	32

### ACCESSORY CARDS

160	Index Add-Ons	Index, Division of Qc Research	86
	Keyboard Template	Look-Up Corporation	31
363	286 Turbochassis	Mega Hertz	210
363	PC Plus Development Hardware	Mega Hertz	84-86
390	286 Turbochassis	Mega Hertz	210

### COPROCESSING SYSTEMS

337	All Card	All Computers	12-13
304	PC Slave 16	Alloy Computer Products	26
102	Color Graphics	AST Research	103
125	RAM Plus	Crimo-Labware	45
159	Account	Creative Computers, Inc.	329
177	PC Turbo 180 S W A T	Maynard Electronics	39
		OrcaTech Technology	96

### VIDEOGRAPHICS BOARD

341	Graphic Software	Amey Technologies Inc. (ATI)	179
101	Color Graphics	AST Research	42
236	Genia Spectrum	Genon Systems Corp.	18
146	Heracles Color Card	Heracles Computer Technology	151
143	Heracles Graphic Card	Heracles Computer Technology	123
	Modular Graphics Card	Paradise Systems	47

## RS# PRODUCT ADVERTISER PAGE#

### EXPANSION UNITS

163	Expansion System	Evans Systems, Inc.	9
-----	------------------	---------------------	---

### INTEGRATED SOFTWARE

135	Art Studio	Lotus	52-53
		Spectrum Holdings, Inc.	66

### ENTERTAINMENT SOFTWARE

363	Charlie Pope	Enlighten	265
-----	--------------	-----------	-----

### LANGUAGES

	Paral	Microsoft	162
--	-------	-----------	-----

### COMPILES

142	Tutor Pascal	Borland International	156-157
348	Macro Amos C	Macro Amos Systems	34
383	Coal Compiler	mhp COBOL	233

### PROGRAMMERS TOOLS

113	Latex TopView Test Basket	Latex, Inc.	180
141	Programmer Tools	PC Board	23-23

### DATABASE MANAGERS

234	GP Tools dBASE Manager	Allen Harris Industries	214
229	PC Pascal	Cominc, Inc.	38
301	MDBS III LAN Knowledge Man	GTE/Telnet/Conax Corp.	82
	P Base	Macro Data Base Systems	128
	Database Manager	Potomac Pacific Engineering	102
394	Software Data Mgr	Software Programming	216

### PROGRAM DEVELOPER/GENERATOR

171	Software Building	Summit Software	87
364	Enter Basic	Summit Software	90

### TEXT EDITORS

182	SFF-PC	Comand Technology Corp.	211
178		Manfield Software Group	202

### OTHER UTILITIES

366/67	DRG	Banner Blue	268
170	STYLEWriter	Carlson Engineering Labs	70
152	Copy II	Central Point Software	78
366	Uniform-PC	Macro Software	99

### INPUT HARDWARE

250	Light Pen	PTG Data Systems	85
390	Light Pen	Megatouch	219

### MASS STORAGE HARDWARE

120	Disk Subsystem	CIA	204
225	AT Plus	Core International	87
361	RAM Plus	Creative Micro, Inc.	12
361	Hard Disk & Tape Backup	Emulard Systems Corp.	23
178	Tape Backup & Hard Disk	Express Systems, Inc.	48-49
153	Tape Back-Up	He-Wel Products	10
177	MegaLight 160	Kanematsu Labs	10
356	Disk Drives	Software Support	274
386	Qix File	Sygnis Inc.	80
	Qix 40	Tetral	C-2

### MODEMS

372	Wacon	Natural Microsystems	36
369	Papcom	Prosource Corp.	19

### NETWORKING

371	Multi PC	Axxa Technology	26
301	MDRS II	Macro Data Base Systems	128
139	LAN Network	Proton Inc.	70
124	Easy LAN	Server Technology	21
373	MultiLink Advanced	Software Link, Inc.	25

### DISPLAYS/MONITORS

181	Taung Color Monitors	Taung	176
		Taung	232

### PRINTERS

213	Printers	Canon USA Inc.	106-107
		Texas Instruments	8

### FOUNTS

162	Fancy Font II	SoftCraft, Inc.	16
164	Personal Frames	IBM (IBM)	40-41
173	Mail Order Frames	IBM (IBM)	27
361	Screen Writer	Quality Micro Systems (QMS)	30
	Print	Texas Instruments	C-3

### PRINTER DRIVES

175	Printer Bus	Connecticut Software	105
363	Lexim	Hammerhead	202

### DISKETTES

240	Mail Order Diskettes	Disk World Inc.	231
144	Mail Order Diskettes	Disk World Inc.	231
280	Dynadisk	Dynadisk	14
130	Proper Disk	MasSoft	16
123	M Diskettes	Prosource Data Products	76
228	Proper Disk	TDK Electronics	76

### ACCESSORIES

118	Accessories	C-Tech Products	187
	Curio Accessories	Curio Manufacturing	C-4
	Curio Manufacturing	Curio Manufacturing	56-57

### KEYBOARD OVERLAYS

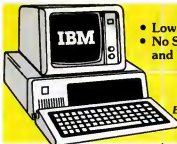
	PC Document	Systems Management Associates	94
--	-------------	-------------------------------	----

### OTHER SUPPLIES-DISPOSABLE

121	Disk Covers	Contemporary Computerware	289
	Literature	Howard W. Sams & Co. Inc.	271
380	Computer Books	Wadsworth Books	48

# Save

**1-800-231-9842**  
WESTERN REGIONAL ORDERS



- Low Low Prices
- No Surcharge for MasterCard and VISA

**1-800-237-4048**  
EASTERN REGIONAL ORDERS

## • COMPUTERS •

IBM ENHANCED AT	5355
IBM ENTRY LEVEL AT	3647
IBM PC, 1 DSDD DR,	
256K	1595
IBM PC, 2 DSDD DR,	
256K	1705
IBM PC, NO DRIVES,	
64K	1293
IBM PC, 2 HALF/1HYTES,	
256K	1631
IBM XT, 1DSDD	
DR/10MB, 256K	3355
IBM XT, 1DSDD DR/ TANDON	
HD, 256K	2108
COMPAQ, 2 DSDD,	
256K	2153

## • MONITORS •

AMDEK 300G	116
AMDEK 300A	132
AMDEK 310A	143
AMDEK 600 RGB	
COLOR	407
AMDEK 710 SUPER	
HI RES COLOR	523
IBM COLOR	605
IBM MONOCHROME	231
PRINCETON MAX-12	154
PRINCETON HX-12 RGB	
COLOR	446
PRINCETON SR-12/SCAN	
DOUBLER	572
QUADRAM	
AMBERCHROME	171
QUADRAM	
QUADCHROME II	424

## • MISCELLANEOUS •

MEMORY, 64K CHIPS	8
MEMORY, 256K CHIPS	39
PRINTER CABLE	10
MICROFAZER BUFFER,	
8K	131

MICROFAZER BUFFER,	
64K	212
VERBATIM, DSDD DISKS	20

## • DISPLAY CARDS •

STB SUPER HI RES 400	402
HERCULES COLOR	145
IBM MONOCHROME	215
IBM COLOR	226
EVEREX GRAPHICS	
EDGE	325
GENOA SPECTRUM	295
TECMAR GRAPHICS	
MASTER	459
PARADISE MODULAR	
GRAPHICS	261

## • BOARDS •

AST SIX PACK PLUS,	
64K	248
AST MEGAPLUS, 64K	281
AST MP-2, 64K	228
AST ADVANTAGE, 128K	384
AST I/O PLUS	122
JRAM-2	169
QUADRAM QUADBOARD	
ØK	240
QUADSPRINT	418
TECMAR CAPTAIN, ØK	219
TECMAR FIRST MATE,	
ØK	200
TECMAR WAVE XT, 64K	187
TECMAR JR CAPTAIN,	
128K	295

## • MODEMS •

HAYES 2400	627
HAYES 300	138
HAYES 300/1200	407
HAYES 1200B w/	
SOFTWARE	380
HAYES 1200B	351
VEN-TEL HALF CARD	374
VEN-TEL 300/1200	
INTERNAL	341
AST REACH HALF CARD	
1200	362

## • PRINTERS •

OKIDATA 83A, WIDE	
CARRIAGE	545
OKIDATA 84P, WIDE	
CARRIAGE	660
OKIDATA 92P	385
OKIDATA 93P, WIDE	
CARRIAGE	602
OKIDATA 2410P	1782
OKIDATA 182	215
OKIDATA 192	363
OKIDATA 182S	259
OKIDATA 184	660
EPSON FX-80,	
TRACTOR	382
EPSON LX-80	248
EPSON FX-185, WIDE	
CARRIAGE	417
EPSON FX-100, WIDE	
CARRIAGE	531
EPSON JX-80 COLOR	
PRINTER	531
EPSON LQ-1500	
PARALLEL	1042
NEC 2050	682
NEC 3550	1045
NEC 8850	1458
JUKI 6100	362
JUKI 6300	695

## • ACCESSORIES •

OKIDATA 82/92	
TRACTOR	44
NEC BI-DIRECTIONAL	
TRACTOR	151
NEC CUT SHEET GUIDE	63
JUKI 6100 BI-DIRECTIONAL	
TRACTOR	105
JUKI 6300 BI-DIRECTIONAL	
TRACTOR	124

**"For All Your  
Computer Needs"**



# COMPUTER MART

1901 S. TAMiami TRAIL, VENICE, FL 33595  
2820 W. CHARLESTON, LAS VEGAS, NV 89102

Call for Non-Advertised and Lower Current Prices.  
IBM is a registered trademark of International  
Business Machines. Prices subject to change. We accept  
MasterCard, VISA, American Express, Discover  
Club, Money Orders, certified and personal checks.  
2% surcharge for shipping and handling. All minimum  
Returns are subject to a 15% restocking fee.

**IN FLORIDA CALL 813-493-2736**  
**IN NEVADA CALL 702-877-3988**

# Why People Are Laughing At Lotus 1-2-3.

...And dBase III, and Wordstar and all the other popular programs. Introducing CHUCKLE POPS, the first program that lets you take a break from your computer, on your computer.

CHUCKLE POPS puts hundreds of the funniest jokes right at your fingertips. Just a simple key-stroke suspends any program and displays a hilarious joke on your screen. Read one. Read a few. You chuckle, you guffaw, you scream with laughter.

Beginning to attract too much attention? Another key-stroke returns you to where you were. Only now you're relaxed,

revitalized and ready to tackle any job. Thanks to CHUCKLE POPS, work has never been this much fun.

CHUCKLE POPS makes a great gift, too. It's backed by a 15 day money-back guarantee. And, at only **\$14.95**, even the price will make you smile.

So start laughing.

Order your copy of CHUCKLE POPS

by calling

**1-800-447-1771.**

In MI, call 1-313-668-6678

**Enlighten**

P.O. Box 20377 Ann Arbor, MI 48106



IBM, Wordstar, dBase III, Lotus and 1-2-3 are registered trademarks of International Business Machines Corp. Micropro International Corp., Ashton-Tate, Inc., Lotus Development Corp. (LDC) and LDC respectively.

To start laughing, send in this coupon along with \$14.95 per copy plus \$2.00 for shipping to Enlighten, P.O. Box 20377, Ann Arbor, MI 48106. Michigan residents add 4% (.60) per copy.

QTY \_\_\_\_\_ TOTAL AMOUNT \_\_\_\_\_

MC ☐ VISA ☐ AM EX ☐ Check ☐ Money Order ☐

\_\_\_\_\_ (CARD #) \_\_\_\_\_ (EXP. DATE)

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Signature \_\_\_\_\_



Break those software

Outside USA add \$5.00 for shipping. Payment must be in US dollars. Sorry, no CDO or purchase orders.

Chuckle Pops runs on IBM PCjr, PC, XT, AT and true compatibles.

# PRINTERS *Plus*

User-Friendly Prices

**800-562-2727**

**NEW!** From **EPSON FX-85**

WITH NLQ  
(REPLACES FX-80+)

**\$339.**

Suggested Retail \$499



**FX-185** WITH NLQ  
**WIDE CARRIAGE**  
(REPLACES FX100+)

**\$459.**

Suggested Retail \$699

- 160 CPS
- NLQ MODE • 8K BUFFER
- SELECTYPE™ • 160 TYPESTYLES
- ONE YEAR WARRANTY

**EPSON LQ-1500**



**\$827.**

Suggested Retail \$1295

**DRAFT TO LETTER QUALITY  
IN ONE AMAZING PRINTER**

- 24 Pin Printer
- 200 CPS Draft Mode
- Over 200 Typestyles
- Ultra-High Resolution Graphics
- Four Times Faster than the Average Daisy Wheel at 67 CPS — Letter Quality

*New Low Prices On Options*

**NEW!**

**DIABLO COMPATIBLE  
DAISYWHEEL PRINTERS**



Standard Epson Code  
To Work With Most  
Popular Computers

**Quantity  
Pricing  
Available  
Upon  
Request**

**EPSON-DX-10**

- 10 CPS • 1 YEAR WARRANTY

**\$234.**

Suggested Retail \$299

**EPSON-DX-20**

- 20 CPS • 110 COLUMN
- ALL-PURPOSE INTERFACE

**\$339.**

Suggested Retail \$499



**NEW!**

**EPSON  
HS-80 LETTERJET**

**\$310.**

- 160 CPS INK JET • PORTABLE or AC
- STANDARD PAPER • NLQ • EPSON CODE

Suggested Retail \$499.

**EPSON LX-80**

Suggested  
Retail Price \$299

**\$214.**



- **SPEED** — 100 characters per second
- **QUALITY** — Near letter quality mode
- **EASE-OF-USE** — Choose popular typesstyles from top control panel with SelectType™
- **VERSATILITY** — Over 160 possible typesstyles — Mix text and graphics on the same line
- **WARRANTY** — Epson's one year warranty

**LX-90**

Suggested  
Retail Price \$329.

**\$225.** WITH TRACTOR  
FEED

**PIC Cable Interfaces Available For:**

- IBM JR. & PC • ATARI • APPLE IIc • GENERIC PARALLEL • COMMODORE

**Special Pricing For  
DEALERS... VARS and other  
Qualified Resellers**

DAISYWHEEL PRINTER  
**ComRiter  
CR-IIIE**

Suggested Retail \$599.

**Special Price**

**\$266.**

**EPSON SQ-2000**

**\$1,459.**

**JX-80 \$464.**

**HI-80 \$357.**

**Qualified Corporate & Educational  
Purchase Orders Accepted**

CIRCLE 373 ON READER SERVICE CARD

**1-800-562-2727**

Or in Missouri call: 1-314-227-4371



**PRINTERS PLUS** / 910 Clayton Rd., #217, Ballwin, MO 63011



SHIPPING AND HANDLING AT ADDITIONAL COST. (MC AND VISA AT NO ADDITIONAL CHARGE) OFFER GOOD WHILE SUPPLY LASTS.  
PRICES ARE IN EFFECT UNTIL NOVEMBER 30, 1995. SOME ITEMS MAY NOT BE AVAILABLE ON PUBLICATION DATE.

# AI: The Formative Years and the Future

Today's revolutionary discovery is tomorrow's everyday occurrence in the field of artificial-intelligence research. *Minds over Matter* and *Tools for Thought* look at the past, present, and future of this exciting science.

When we use a computer to write a report or juggle a budget, the machine simply follows our instructions. As magical as the results may seem, the computer is essentially a dumb but very fast data manipulator. Now that scientists have mastered the more mundane applications of the computer, they are moving on to the next frontier—a computer that can think as humans do. This new science, which has come to be known as artificial intelligence, is the subject of two books from Simon & Schuster: *Minds over Matter* by Jeffrey Rothfeder and *Tools for Thought* by Howard Rheingold.

In *Minds over Matter*, Rothfeder examines the recent history and current state of AI research. Rothfeder breaks AI down into three major areas: expert systems, natural languages, and robotics.

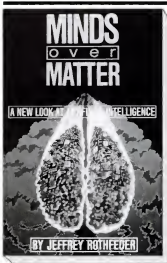
An expert system is a computer that has the ability to understand, interpret, and solve problems the way an expert in a given field does. Expert-system technology is the most successful application of AI so far, helping physicians to diagnose diseases or geologists to pinpoint drilling sites, for example.



***Minds over Matter***  
 Jeffrey Rothfeder  
 Simon & Schuster Inc.  
 1230 Ave. of the Americas  
 New York, NY 10020  
 (212) 245-6400  
 Copyright: 1984  
 Cover Price: \$15.95  
 ISBN: 0-671-53206-5

CIRCLE 693 ON READER SERVICE CARD

Natural-language research is devoted to teaching the computer to understand the English language and all of its nuances. It's a tough job. Think, for instance, of the two sentences "I like books" and "I like reading." The ideas



conveyed by these sentences are similar, and we can understand both easily. A computer, however, could have a vocabulary database jammed with words, and it would still be unable to understand these simple concepts.

Robotics is perhaps the most exciting branch of AI, but it is the one that is most skeletal and most technologically threatening. The "intelligent" robot must incorporate an expert system, natural-language comprehension, and vision.

Although it will be some time before robots are widely available (or accepted), they have great potential in both the workplace and the military.

At the center of all artificial-intelligence research is the question of how we think and learn. Today, AI researchers are primarily concerned with understanding the workings of the brain, rather than trying simply to imitate it. Most feel that heuristics are the key. Heuristics are the commonsense rules that we use to steer our way through a day. For example, we rely on heuristics when we decide to take one route instead of another because it is raining. While such a decision seems straightforward, it incorporates many intermediate—almost subconscious—decisions based on experience, inference, and even guesswork. This kind of thought process is still out of a computer's reach but may be possible in the not-too-distant future.

One heuristics-based expert system that is in use today is *Mycin*, a program developed by Edward Shortliffe, assistant professor of medicine and computer science at Stanford University. *Mycin* diagnoses blood and meningitis infections and recommends drug treatments. The program consists of over 200 medical rules that Shortliffe compiled from discussions with his colleagues. The rules are written in "if-then" form; when processed interactively with data from a user, they allow *Mycin* to arrive at a possible diagnosis. Although it is far from perfect, *Mycin* is a model for other expert systems.

A fine introduction to artificial intelligence, *Minds over Matter* is serious, yet breezy and compact.

**Patriarchs, Pioneers, and Infonauts**

Anyone who thinks that the computer revolution began in 1945 with ENIAC should pick up Howard Rheingold's *Tools for Thought: The People and Ideas*

**Behind the Next Computer Revolution.**

This new book is an ambitious, open-ended time-line of technology.

Rheingold's premise is that the ongoing work toward developing computers

that will allow us to be more productive and creative actually began back in the mid-nineteenth century. He identifies three "waves" of computer scientists: the patriarchs, the pioneers, and the infonauts.

The patriarchs are a lively and eccentric bunch. Charles Babbage and his helper Ada, the Countess of Lovelace, were perhaps the earliest hardware designer and programmer, respectively. Babbage built a digital machine known as the Analytical Engine, which Ada attempted unsuccessfully to program in order to bet on the horse races. George Boole and Alan Turing were patriarchs as well. Boole is responsible for the algebraic system based on "the universe" (1) and "nothing" (0), which evolved into the binary system used today. Turing, a British mathematician whose head was mostly in the clouds, used Boole's work to develop the first formal system of computation.

Working in the 1930s and 1940s, Norbert Wiener invented cybernetics, the science that compares the computer to the human nervous system. Claude Shannon translated the principles of Boolean algebra into its first practical application—electrical switches that open or close a circuit. He is credited with defining information theory.

Rheingold's point about these and other early researchers is that they were dreamers whose ideas were as way-out for their times as the weirdest sci-fi plot is today. By the 1950s, the world was readier to accept the computer. Information theory, modeling, and the idea that the computer could be a tool for commu-

## Org™ makes Organization Charts... Quickly

**Announcing Org, to give you the advantage of an up-to-date, professional looking Organization Chart... no matter how often it changes**

Your organization chart is a powerful tool to communicate company structure and change. Yet new charts are time consuming to make and revise. Often they are out-of-date and poorly drawn.

Now there's Org—a program for the IBM PC and compatible computers.

Org dramatically reduces the time it takes to create and maintain your organization chart.

**Just Enter Names**

Simply type names, titles and comments into a display that shows each manager and his or her direct subordinates.

Now Org does the hard work.

**Draws Automatically, Professionally**

Org automatically draws and spaces the boxes, centers the text and precisely lays out the connecting lines. For a chart of 25 employees this involves over 23,000 separate calculations. (No wonder it takes the entire afternoon to make one by hand.) With a typical printer you have your chart in about 3 minutes.

Your printed chart is clean and exact.

And you can use it in any situation, no matter how formal.

**Easily Update Charts**

With several keystrokes you can add, delete, or move employees—even entire departments.

The revised chart is immediately available to explain and communicate the new organization.

Complex charts can be as large as 11 by 14 inches with up to 250 employees and 99 levels. Staff and dotted-line reporting relationships are provided for.

**Try Org Risk Free**

Don't wait until someone asks you for a current organization chart. Order today and be ready. The cost is less than doing one simple chart by hand.

30 day money back guarantee if you are not satisfied for any reason.

**\$69.95** plus \$3.00 shipping, 72.95 total  
CA residents add \$4.55 sales tax.

To order, call 415-794-6850.

**Banner Blue**  
5278 Reeder Court  
P.O. Box 7865  
Fremont, CA 94537

Org works on any IBM PC/XT/AT or 100% compatible computer with 512Kb of RAM. DOS version 2.0 or higher and a printer are required. Org is not copy protected. A 60 page User's Guide and telephone support are included.  
IBM is a registered trademark of International Business Machines Corp. ©1985 Banner Blue

**Banner Blue** 5278 Reeder Court, P.O. Box 7865, Fremont, CA 94537, Phone (415) 794-6850

Send me a copy of Org.™ I want my organization chart to be up-to-date and professional looking. Org has a 30 day money back guarantee if I am not satisfied for any reason.

\$69.95 plus \$3.00 shipping. CA residents add \$4.55 sales tax. Outside USA add \$10.00 and make payment in US dollars drawn on a US bank.

☐ Check ☐ MasterCard ☐ Purch. Order ☐ VISA ☐ American Express

Card No. \_\_\_\_\_ Expire \_\_\_\_\_

Name \_\_\_\_\_ Signature \_\_\_\_\_

Company \_\_\_\_\_ Phone \_\_\_\_\_

Shipping Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

CIRCLE 368 ON READER SERVICE CARD

**Tools for Thought**

**The People and Ideas Behind the Next Computer Revolution**  
Howard Rheingold

Simon & Schuster Inc.  
1230 Ave. of the Americas  
New York, NY 10020  
(212) 245-6400

Copyright: 1985

Cover Price: \$17.95

ISBN: 0-671-49292-6

CIRCLE 692 ON READER SERVICE CARD





# NETWORK NEWS

Vol. 1, No. 3

A GUIDE TO THE PROMISED LAN\*

Oct. 29, 1985

## PROLAN Network Design Makes Expansion Easy!

### Low Per Node Cost Makes PROLAN The LAN Price Leader!

PROLAN recognizes that no two customers have the same LAN requirements. That's why we designed the PROLAN Network to be easy to install and easy to expand. PROLAN matches your growth by linking as few as two computers up to as many as 255.

With PROLAN, any IBM PC, with a PROLAN hard disk or IBM XT or AT, can be a File Server. This means that many users can share hard disks, printers, and other expensive peripheral devices. You can enter or extract information from common files. You can use

higher programs. All at a low per-user cost.

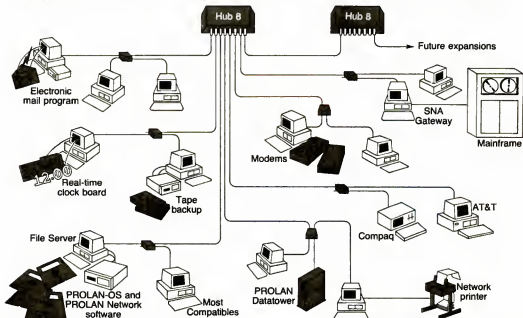
PROLAN uses hubs and conventional coaxial cable to connect computer workstations (nodes) together. Use the passive hub (Huh 4) to connect up to four nodes. If you need a larger network, the active hub (Huh 8) can connect up to 8 nodes. Combining one Huh 8 with eight Huh 4's, you can support 24 nodes. And with multiple Huh 8's you can configure up to 255 workstation LANs.

Each PC must have a PROLAN Network Interface Card (NIC). This card, consisting of a transceiver, LAN controller, data buffer and PROLAN ROM, sells for only \$595, making PROLAN the price leader among full feature LANs.

The PROLAN Network Operating System allows you to protect your data, share files with other users, lock specific files and records for private use, and access any hard disk, network clock, or printer on the network. Because PROLAN includes three types of passwords at two levels, network managers can manage and restrict rights to valuable corporate information.

PROLAN 2.0 Network Software comes complete with full Professional Features, including Print Spooling for up to 64 named devices, File Service for up to 255 PC workstations/File Servers, and full multuser record and file locking utilities. And PROLAN bundles the famous LAN MAIL MONITOR<sup>SM</sup> package free with every network to turn your PROLAN Network into a powerful communications system.

With optional disk drives from 10-876MB, optional SNA Gateway, optional fibre optic cabling, and optional multuser software, you can build the kind of LAN that best suits your own needs. To keep pace with your expanding PC environment, now... and in the future.



PROLAN Corporation  
3100 Westway, Suite 230, Houston, TX 77027  
Telephone: (713) 877-1155  
Dealer Inquiries Invited

**PROLAN**  
Professional Local Area Networks

## BOOK REVIEW

nication took hold. However, scientists began to find that their projects were so complex that they were slowed by primitive data processing techniques. The pioneers got to work. Clumsy punch cards gave way to paper tapes, which could be changed while a program was running. Interactive machines with graphic displays soon followed.

The pioneers found themselves confronted with the challenge of integrating the fledgling computer technology so that everyday chores could be simplified and human intellect advanced. Doug Englebart is a good example of such a pioneer. Englebart, whom we recognize as the inventor of the mouse, felt that computers could help people think and communicate more effectively. He called his idea *augmentation*, which he preferred to the term *automation*. As part of his augmentation program, Englebart developed a primitive text editor and demonstrated it to a packed audience at San Francisco's Civic Auditorium. According to Rheingold's description, the editor, despite its crudeness, amazed the audience. Think of how we take word processing for granted today.

Other pioneers suggested novel applications for computers. Vannevar Bush, who directed over 6,000 U.S. scientists during World War II, developed a hypothetical machine called a memex. The memex would extend human memory by storing large amounts of information.

M.I.T. professor J.C.R. Licklider designed a computer system called Whirlwind, which featured a visual display screen that worked with a lightpen manipulated by the user. Whirlwind also had rudimentary decision-making power that enabled it to suggest alternative courses of action based on its internal model of a situation.

The final chapters of *Tools for Thought* present the new generation of computer scientists, whom Rheingold labels infonauts. These young people are now working on enhancements that will be available in 10 or 20 years. Because they are concerned with the social effects

of computers, they design expert systems and other programs that not only help people learn, but play too. The infonauts want computers to encourage, rather than hinder, creativity.

*Tools for Thought* takes a fresh approach to the history of the computer industry. Many of the people and events it describes have not appeared in other, similar volumes. ■

## How to succeed in business with SAMS books.

When you're using the most popular business software, SAMS books can get you up and running in no time.

Choose from a wealth of powerful programs in *Managing with dBASE III™*. Author Michael Clifford explains every feature from inventory control to graphics in an easy-to-understand format.

*The Best Book of: dBASE III/III™* by Ken Knecht explores all the features of dBASE, from the fundamentals to command files to advanced programming.

*Microsoft WORD™ for the IBM PC* by Philip Lieberman and Phillip J. Gioe shows you all the word processing shortcuts from enter and revise to formatting, using style sheets and multiple windows. Plus helpful techniques for using the mouse and the Spelling Checker.

Nothing succeeds like success. Especially when you use SAMS books for better business management. Visit your local SAMS dealer, or call our toll-free number and ask for Operator 185.

*Managing with dBASE III™*  
No. 22455, \$22.95

*The Best Book of: dBASE III/III™*  
No. 22349, \$19.95

*Microsoft WORD™ for the IBM PC*  
No. 22348, \$12.95

**800-428-SAMS**

Ask for Operator 185.

In Indiana, call 317-298-5566

**SAMS**

Howard W. Sams & Co., Inc.  
A Subsidiary of Macmillan, Inc.  
4300 West 62nd Street  
Indianapolis, IN 46268



*Terry Nasta is a technical writer for Informatics, a large software development company. She lives in New York City.*



# Index To Advertisers

RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page
357	All Computers	12-13	225	Core International	87	160	Jeden	86	382	Personal Computer Products	70
234	Allen Harris Industries	214	140	Corporation Software	58	343	K Software House	217	365	Plus Development	88-89
201	Alloy Computer Products	20	218	Cosmos	78	317	Kurumenman Labs	180	134	Polaris	191
119	Amber Systems, Inc.	11	381	Creative Microsales	229	113	Lanice, Inc.	180	*	Potomac Pacific Engineering	4
138	Analytics International Inc.	222	*	Curtis Manufacturing Co. Inc.	C-4	302	Le Baugh Software	194	*	Potomac Pacific Engineering	212
371	Anex Technology Inc.	29	*	Curtis Manufacturing Co. Inc.	56-57	385	Lifeline Software Inc.	217	123	Precision Data Products	2
114	Arlington Computer Products	95	*	Cygnal Technologies	217	282	Logisoft	80	187	Primavera Systems	205
341	Army Technologies, Inc. (ATL)	179	148	Dac Software, Inc.	17	*	Look-Up!	31	373	Printers Plus	266
101	AST Research, Inc.	42	117	Discount Computer Centers	276	*	Lotus	52-53	188	Programs Plus	69
102	AST Research, Inc.	102	240	DISK WORLD!, Inc.	231	363	Magnum PC	199	139	Proton	270
155	Atomics	223	244	DISK WORLD!, Inc.	234	237	Main Street Computer Corp.	218	*	Quaid Software Limited	232
368	Banner Blue	268	139	DISK WORLD!, Inc.	257	378	Mainfield Software Group	202	361	Quality Micro Systems	30
367	Banner Blue	268	109	Discount Microsales	198	24	Max Software	24	379	Quick Soft	131
107	Bay Express Company	230	108	Discount Microsales	186	230	Maxell Corporation of America	1	369	RealWorld Corporation	5
112	Bellsoft	229	289	Dyan Corporation	14	159	Maynard Electronics	39	304	Sanyo Business Systems	32
173	Bellwether Software	221	362	Enlighten	365	383	mhp Cobol	233	470	SBT Corp.	25
103	Blaha Software, Inc.	225	*	Emerald Systems Corp.	2-3	168	MCBS	76	124	Server Technology	21
142	Borland International	156-157	163	Everex Systems	9	390	Megahertz Corp.	217	162	Soft/Craft, Inc.	16
147	Borland International	159	178	Express Systems	48-49	301	Micro Data Base Systems, Inc.	228	*	Softline Corp.	77
*	Business Computers	203	374	Esys, Inc.	277	332	Microcentals	219	171	Software Bowling Company	67
389	Business Tools, Inc.	269	242	474 Computer	226-227	*	Microfilm	72-73	393	Software Link, Inc.	55
118	C-Thru Products	187	250	FTG Data Systems	85	366	MicroSolutions	99	156	Software Support	274
213	Cannon Computers and Printers	106-107	252	Garden of Eden Computers	194	326	Microstar, Inc.	84	394	Software Programming	216
370	Carolina Engineering Laboratories	70	238	Genex Systems Corp.	18	212	Microstar, Inc.	187	135	Spectrum Holobyte	66
360	CBS Software	190	376	Graphic Communications	197	215	Microstar, Inc.	189	384	Summit Software Technology, Inc.	90
152	Central Point Software, Inc.	78	229	GTE Telenet Communications Corp.	92	214	Microstar, Inc.	191	*	Sygen Incorporated	80
120	CIA	204	319	Gulfstream Micro Systems	238	340	MLI Microsystems	223	222	Systems Compatibility Corp.	206
182	Command Technology Corp.	211	260	H&E Computers, Inc.	278	167	Multitech Electronics	212	*	Systems Management Assoc.	94
228	CompAdd	192-193	303	Hammer Computer Systems	61	372	Natural Microsystems	36	181	Tatung	220
205	Compaclicious	258	268	Hannaford Corp.	202	126	Northeastern Software	48-49	391	Taxan	176
*	COMPUMAIL	272	145	Hercules Computer Technology	123	346	Norton Utilities	189	226	TDK Electronics	76
375	Computer Hut	93	146	Hercules Computer Technology	151	388	Oak Park Software	224	386	Tecmar Inc.	C-2
185	Computer Mail Order	74-75	353	Hewlett-Packard	19	177	Orchid Technology	96	358	TEK Computers	188
183	Computer Mart	214	19	Howard W. Sams, Inc.	271	351	Orya Systems, Inc.	26-27	206	Telarc	new Telemat
*	Conway Electronics	179	180	Hypergraphics	275	141	PC Brand	22-23	206	Telecom	62
175	Connecticut Software	105	158	IBM-ISC Division	40-41	339	PC Connection	146-149	*	Texas Instruments	C-3
125	Conroy-La Pointe, Inc.	45	243	In-House Software	44	207	PC Network	182-185	*	Texas Instruments	8
121	Contemporary Computer-Wear	195	*	James River Group, The	98	144	PC Software Interest Group	224	*	Walden Books	68
						364	PC's Limited	244-245	176	Warehouse Data Products	60
										XyQuest, Inc.	213

## PC MAGAZINE ADVERTISING SALES STAFF

Eugene Duncan - Advertising Director  
 Pauline Scherer - Advertising Sales Manager/Telemarketing  
 Miriam Hernandez - Assistant to the Advertising Director  
 Advertising Coordinators . . . Robert Simpson, Jeanne Woodcock  
 1 Park Avenue, New York, NY 10016 (212) 503-5100

MA, NH, VT, ME, RI, CT  
 Kathy Krochta - District Manager  
 160 State Street  
 Boston, MA 02109  
 (617) 367-7190  
 John Bucknagaw - Account Representative  
 (212) 503-5100  
 So. NJ, DE, MD, DC, VA, WV, NC,  
 SC, AL, MS, LA, TN, AR, KY, PA, GA  
 Bob Ostrow - District Manager  
 1 Park Avenue  
 New York, NY 10016  
 (212) 503-5300  
 Lauren Moore - Account Representative  
 (212) 503-5100

NY, NJ, FL  
 Ellen Atkinson - District Manager  
 1 Park Avenue  
 New York, NY 10016  
 (212) 503-5307  
 Joel Zuckerman - Account Representative  
 (212) 503-5100  
 OK, NE, WI, IL, IN, MN, KS, MO,  
 OH, MI, IA, ND, SD, Canada  
 John Herman - District Manager  
 180 N. Michigan Avenue Suite 1400  
 Chicago, IL 60601  
 (312) 46-2600  
 Michael Tupperman - Account Representative  
 (212) 503-5100

Jeff Miller - Western Advertising Manager  
 CA (San Francisco & North), OR, WA  
 Dave Riegler - District Manager  
 11 Davis Drive  
 Belmont, CA 94002  
 (415) 598-2341  
 Janet Bell - Account Representative  
 (212) 503-5100  
 CA (Santa Barbara to So. San  
 Francisco), CO, ID, MT, UT, AK, NV  
 Jeff Cohen - District Manager  
 11 Davis Drive  
 Belmont, CA 94002  
 (415) 598-2341  
 Jane Anderson - Account Representative  
 (212) 503-5100

CA (Orange County), AZ, NM, TX  
 Page Goodrich - District Manager  
 1601 Dove Street  
 Newport Beach, CA 92660  
 (714) 476-0749  
 San Johnson - Account Representative  
 (212) 503-5100  
 CA (Los Angeles & San Diego), HI  
 Steve Lincoln - District Manager  
 3460 Wilshire Blvd.  
 Los Angeles, CA 90010  
 (213) 387-2100  
 Joanna Broscoe - Account Representative  
 (212) 503-5100

# HARD DRIVE PRICE BREAKTHROUGH

## STARTING AT \$299.95!

5 to 60 megabytes complete easy to install internal and external systems  
— will boot just like an XT — fully warranted —  
same day shipping from stock — fast service — free technical assistance

**\$499.95 to \$999.95**

## STREAMING OR FLOPPY TAPE BACK UP SYSTEMS

complete internal and external systems

## \$1,995.00 — IBM XT WORKALIKE SPECIAL

20 megabytes — one floppy — 640K — clock calendar — serial port — parallel port  
monochrome card — monochrome monitor with tilt and swivel base  
Keytronics 5151 style keyboard — one year warranty — shipped from stock

### MEGADISK™ HARD DISK DRIVE SYSTEMS

For the { IBM/PC, Tandy 1000, TRS/80 Models I/III/IV/4P, Compaq, PC Workalikes, Color Computers, Heath/Zenith, Max/80

{ Complete with Hardware, Cables, Software and Quikfit Installation

### TOLL FREE ORDERING 1-800-343-8841

5 Megabytes Internal Mount	starting at \$ 279.95
10 Megabytes Internal Mount	starting at 439.95
20 Megabytes Internal Mount	starting at 479.95
5 Megabytes External System	starting at 499.95
10 Megabytes External System	starting at 639.95
20 Megabytes External System	starting at 799.95
Tape Backup System — Internal Or External	starting at 449.95

**Wow! New Low Prices** CALLS

DOS Systems Available: { IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, or later  
{ TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus, CP/M, COCO DOS, Max/80 LDOS, OS9

FULLY WARRANTIED — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841

### IBM ENHANCEMENT CARDS

Multifunction with 384K	\$259.95	Color graphics	\$139.95
Serial port, parallel port		Monochrome/RGB Color	229.95
Clock calendar, game port		Disk controller with cable — up to 4 drives	79.95
Serial port — two port	69.95	384K memory	129.95
Monochrome only	119.95	Hard drive controller	159.95
Monochrome graphics w/parallel port	159.95	Keytronics 5151 style keyboard	129.95
Network card			249.95

**DEALER INQUIRIES INVITED**

**CALL 1-617-872-9090**

**PRICES CHANGE EVERY DAY**

**CALL 1-800-343-8841**

PC

©  
1985

## SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

**SERVICE POLICY** — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday.  
**WARRANTIES** — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years.  
**SERVICE** — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

**Toll Free 1-800-343-8841**

Please Call For Shipping,  
Handling And Insurance.

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors.  
Prices and Specifications May Change  
Without Notice.

CIRCLE 156 ON READER SERVICE CARD

# YOUR STROKE OF GENIUS

Let our On-Line Reference series increase your productivity...  
Just a keystroke away!



**OLE™**, our new On-Line Encyclopedia series for IBM PC's and compatibles is organized by subjects and alphabetically by keywords ... for quick specific reference or indepth study. OLE uses pictures, animation, text, and understandable annotations to help you get up to speed quickly on any covered topic.

OLE is just a keystroke away because it sits co-resident in memory allowing you to access one or more of our encyclopedia series.

OLEs will increase your computer proficiency and enhance your productivity. Using OLE will be a stroke of genius on your part!

The first six volumes currently available are:

**OLE DOS** Makes all the complex DOS commands easy to understand and implement. Suggested retail price, only **\$69.95**.

**OLE UNIX** A clear, concise and unambiguous introduction to the UNIX multi-user operating system. Suggested retail price, only **\$69.95**.

**OLE Data Communications** Clarifies complex concepts with more than 75 key terms presented. Suggested retail price, only **\$69.95**.

**OLE BASIC** An excellent guide for learning to program using BASIC. Quick on-line reference of key terms. Suggested retail price, only **\$69.95**.

**OLE Computer Literacy Vols. 1 & 2** Volume 1 is a keyword based tutorial of fundamental terms. Volume 2 provides an easy intro to databases, spreadsheets, word processors, accounting and graphics. Suggested retail price, each volume, only **\$39.95**.

Requirements: IBM Color Graphics Adaptor Card required. 256K RAM.

To order call toll free  
**1-800-GET-OLÉS**

CIRCLE 158 ON READER SERVICE CARD

**HYPERGRAPHICS**  
CORPORATION

308 N. Carroll Blvd.  
Denton, TX 76201







# Coming Up

## High-Performance Computing

With the PC AT, IBM introduced new performance standards into the world of personal computing. Users are no longer satisfied with a mere 4.77-MHz clock speed, 256K bytes of RAM on the motherboard, and 10-megabyte hard disk drives. As a result, third-party manufacturers are rushing to get new machines that are built around the improved 80286 chip as well as boards that enhance the performance of the standard PC out of the development labs and into the marketplace. In the next issue of *PC Magazine*, Alfred Poor, Charles Petzold, and Frank J. Derfler, Jr., review several of the advanced computers, and Winn L. Rosch takes on the latest crop of accelerator boards. In the *PC Magazine* Labs, these reviewers tested the machines for speed, compatibility with the standard IBM PC and PC AT, quality of workmanship, and ease of use. The results may give you some good reasons to upgrade your system.

## Special Report: Near-Letter-Quality Printers

Several of the dot matrix printer manufacturers in the market today claim their machines have a near-letter-quality print capability. But how does the print quality produced by these printers really stack up? Paul Chisholm gathers print samples from 13 different printers and evaluates them. His results reveal which printers achieve true near-letter-quality print and which ones don't even come close.

## Statistical Analysis for the PC

It's true that data rules the business world, but a pile of statistics the height of the Sears Tower can't help you run your business unless you have some method of analyzing them all. If you want to mine the mother lode of information that lies hidden in the myriad of numbers that pass through your office, you need PC software that makes sense of raw statistics. Charles Petzold rolls up his sleeves and crunches numbers with two such packages: Computing Resource Center's *STATA* and STSC's *Statagraphics*. Both help you make interpretive sense out of numerical chaos, but each offers something different. *Statagraphics* includes a treasure chest of APL features and *STATA*'s speed lets you quickly build your own system.

## Communications Buffers

Does your business suffer from a communications bottleneck? A communications buffer can help you speed up and automate your communications tasks, and thus enhance your productivity. Buffers vary widely in capabilities and features, however, so it may be difficult to choose the right one to meet your particular needs. *PC Magazine*'s communications expert M. David Stone does some of your buffer-shopping work for you with this in-depth examination of two products from Hayes and Prometheus.

## Multiuser DBMSs

Multiuser database management is one of the fastest growing categories of software for the PC. These systems can greatly increase the value of your data files by making them simultaneously accessible to workers in different, and sometimes widely separated, departments. In this article, John R. Phillips examines the pluses and minuses of three multiuser database packages: the familiar *PICK*, the newcomer *TEAM-UP*, and the recently updated *Network Revelations*.

# EXSYS

## EXPERT SYSTEM DEVELOPMENT SOFTWARE FOR THE IBM PC

### ANNOUNCING VERSION 3.0

Version 3.0 of EXSYS has been released and adds to already impressive power of EXSYS. EXSYS has a new report generation capability that improves the ability to interface with other programs and allows expert systems to be created that can examine the records in a report from your data base manager and produce a full report of the analysis. EXSYS version 3.0 also accepts string variables, uses IF-THEN-ELSE rules, passes and receives data from external programs and is upwardly compatible with a soon to be released VAX version. EXSYS is written in C for VERY fast execution and can still handle over 5000 rules. EXSYS uses backward chaining and can fully explain how a conclusion was reached and why information is needed. Several systems of probability or confidence factors are supported. EXSYS requires only 256k but will use all available memory and is not copy protected.

The price of the full EXSYS program is \$395, including manual, editor, runtime program, utility to arrange rules for maximum speed of execution and teaching program on how to create expert systems.

### EXSYS DEMO - \$10

Demo includes expert systems to run, text of manual, teaching program on how to create expert systems and ability to create and run (but not save) your own expert systems



**EXSYS, Inc.**  
P.O. Box 75158  
Contr. Sta. 14  
Albuquerque, NM 87194  
(505) 836-6676



# Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • XEROX™



## The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

### VERSARECEIVABLES™

\$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement generating system. It keeps track of all information related to who owns your or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

### VERSAPAYABLES™

\$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

### VERSAPAYROLL™

\$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

### VERSAINVENTORY™

\$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

### VERSALEDGER II™

\$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system without any additional software.

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally written 160 page manual designed for first time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

CIRCLE 260 ON READER SERVICE CARD

### SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module.

To Order:

**Write or call Toll-free (800) 431-2818**  
(N.Y.S. residents call 914-425-1535)

- \* add \$3 for shipping in UPS areas
- \* add \$4 for C.O.D. or non-UPS areas

- \* add \$5 to CANADA or MEXICO
- \* add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change. Delivery subject to availability.



# COMPUTRONICS!

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

\* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. \* APPLE is a trademark of Apple Corp. \* IBM is a trademark of IBM Corp. \* OSBORNE is a trademark of Osborne Corp. \* CP/M is a trademark of Digital Research. \* XEROX is a trademark of Xerox Corp.



## Westinghouse brought in TI's Personal Consultant™ because these experts don't have time to waste.

Personal Consultant is the expert systems development software that's turning the time they spend answering routine questions into research and development.

Dr. Neil Pessall and Dr. Jan Schreurs, research scientists at the Westinghouse Research and Development Center, had a problem. How could they make hundreds of man-years worth of practical knowledge at the Center readily available to Westinghouse and its customers, without pulling the scientists away from their research to answer routine questions?

Their solution was Personal Consultant, a new expert systems development software tool from Texas Instruments for TI or IBM® personal computers.

Designed to run on 512K-Class Personal Computers, Personal Consultant

provided Westinghouse an eminently affordable new tool for the development of expert systems. Pessall and Schreurs were especially impressed with its ability to aid experts in developing the knowledge bases and prototyping programs which even first-time computer users could consult for expert advice.

"With Personal Consultant software," says Schreurs, "we found it far easier to teach our experts how to develop a system than teach a programmer to be an expert." In fact, the software's rapid expert system prototyping and simple debugging features enabled the two scientists to demonstrate three different expert systems in as many weeks. Schreurs produced one for training new salespeople and a second to guide repairs and maintenance for the Center's X-ray diffractometer.

Pessall's makes material recommendations for tubes and support plates in steam generators.

"Our development of expert systems isn't aimed at replacing experts," says Dr. Pessall. "Its purpose is to give them the time to extend their expertise while the expert systems handle consultations on well-established knowledge and methodology."

To put Personal Consultant from TI to work for your business, call (800) 527-3500, in Canada call (416) 884-9181. Because an expert's time is too valuable to waste.

  
**TEXAS  
INSTRUMENTS**  
Creating useful products  
and services for you.



## You deserve a better look at your portable.

If you want to see what you've been missing, mount your IBM or Compaq Portable on the Portable Pedestal, Curtis' newest ergonomic accessory. You'll quickly see, the Portable Pedestal minimizes glare and virtually eliminates eye fatigue, as well as common back and neck strain.

The Portable Pedestal's adjustable base tilts 22° and swivels 360°, letting you position your computer just the way you want, for a comfortable, direct view to the display. The Portable Pedestal from Curtis—it's what you deserve.

For the Curtis dealer nearest you call (603) 924-3823.

**NEW!**

**Command Center:** Individually switched, controls up to 5 peripherals, surge protection with EMI-RFI filtering, digital clock, master key switch, 8.5 ft. power cord, circuit breaker, static discharge. Lifetime Warranty.  
Retail . . . . . \$179.95



**NEW!**

**Crystal Power Conditioner:** Protects against surges and brownouts, 4 outlets, 7 ft. power cord, power switch, safety meter, EMI-RFI filtering. Available in 150 or 300 watt models. Lifetime Warranty.  
Retail . . . . . \$179.95-\$239.95



**NEW!**

**SS-2 System Stand:** Holds IBM PCAT system unit vertically, occupying less space. Unit can be placed on floor, freeing desk top space. Vertical positioning reduces disk drive wear. Lifetime Warranty.  
Retail . . . . . \$49.95



**Curtis Surge Protectors:**

Leading surge protectors in the micro-computer marketplace. Lifetime Warranty, 6 ft. power cable, EMI-RFI filtering available. Four styles.  
Retail . . . . . \$49.95-\$9.95



Manufacturing Company, Inc.

# CURTIS

305 Union Street, Peterborough, New Hampshire 03458